PACIFIC MARINE REVIEW

Official Organ
Pacific American Steamship Association
Shipowners Association of the Pacific Coast

JANUARY

"AMERICAN FISHER"

from the Sea

Problems Answered--by The Chief

Letter to American Ship Officers

PACIFIC MARINE REVIEW

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CONTENTS

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PACIFIC MARINE REVIEW

VOLUME XXXIV JANUARY 1937 NUMBER 1

Editorial Comment »« »«

A New Deal for Licensed Officers

Do you know, Mr. First Assistant, just what is involved in the design of your turbine plant, or what improvements have been made in marine boiler design during the past five years?

Do you know, Mr. Second Officer, the principles underlying the operations of a winch, a windlass, or a steering engine, or how research is constantly improving the functioning of those mechanisms?

These and similar questions are going to be faced by American Merchant Marine officers in the near future.

Improvements and new ideas have been coming so rapidly in the past few years that they are on the ships before they get into the textbooks. The American Merchant Marine is the most backward in the world at the present time, but it is awakening to that fact and it is bound for the leading position. Because of this fact, the licensed officer aboard American ships is faced with a new and very interesting responsibility. He must, in the language of the street, "Get wise to himself." In other words, the licensed officer on ships of the American Merchant Marine should thoughtfully take stock of his position as we go into the new year.

The American seagoing merchant marine is due for a physical reconditioning. More new Federal regulations concerning ship's equipment and ship's personnel were passed by the last Congress than by any other in recent history.

Congress is headed for a large shipbuilding program to produce the modern new vessels needed for naval auxiliaries and for meeting foreign competition in the race for international trade. All existing ships are to be brought up to date or scrapped.

With this type of program in mind it is only natural that much attenrion should be paid to personnel aboard ship, and particularly to licensed personnel. The new organization of the Marine Inspection Bureau is prepared to clamp down hard on inefficiency and carelessness on deck or in the engine room. Along with the ship and her physical equipment, the existing licensed personnel must be either brought up to date or scrapped.

It is with these conditions in mind that the publishers of *Pacific Marine Review* have arranged a series of articles under the heading *"Your Problems Answered," by the Chief.*

The introductory installment of this series appears on pages 26 and 27 of this issue.

Our aim is to present to the engineer each month reliable, up to date information on the basic principles underlying the modern improvements in propulsive and auxiliary machinery aboard ship. This material will be presented in ways calculated to encourage and provoke thoughtful consideration on the part of the engineer. For this purpose we have available the services of several of the best qualified experts in the United States.

This material should be of great interest also to the deck officers. In Europe the boards of examiners are insisting that deck officers have a working knowledge of simple engineering fundamentals. At Washington the trend is in that direction.

In short, all transportation, including marine, is being speeded up, streamlined, and more amply powered. High pressure is the order of the day. The licensed officer who is unable or refuses to recognize this condition is left at the post. Put study and thought into

the management of the power plant under your care and you will soon be getting dividends.

We will be very happy to get suggestions or criticism from the licensed personnel, and to give such material careful consideration. *Watch this series* and help us to make it a constructive, useful tool for the officer aboard ship.

Pacific Marine Twenty-Five Years Ago

The January, 1912, number of Pacific Marine Review still declared itself to be the *"First Established and Only Exclusive Marine Paper Published on the Pacific Coast,"* and still flaunted at its masthead the motto *"Be Just and Fear Not."*

The lead article dealt with Seattle's Proposed Port Improvements. Seattle's Port Commission was then considering building docks at Smith's Cove, the Central Waterfront and the East Waterway. Pacific Marine Review proposed in lieu of a passenger dock on the central waterfront that a floating landing stage and a large maritime passenger depot be considered, and also that measures be taken to prevent dumping in Elliot Bay.

Los Angeles was getting ready to sell bonds for the improvement of her inner and outer harbors.

S.S. Kroonland and S.S. Finland, of the International Mercantile Marine Red Star Line, had recently come back into American Registry in preparation for Intercoastal Service when the Panama Canal opened.

Union Iron Works of San Francisco had on the ways or at the outfitting dock, the Kilauea for the Inter-island Steamship Company, and three submarines for the United States Government. Two more submarines were on order.

Seattle Construction and Dry Dock Company, under the management of Mr. J. V. Patterson, had recently acquired the assets and goodwill of the Moran Company and were preparing to expend a million and a quarter of good dollars for improvements and additions to plant. A new floating deck was assigned $600,000 of these funds. This Company had under construction five steel whaling steamers, and a steel shallow draft passenger steamer and were completing two submarines.

Our editor issues a three page blast on the subject "Hydrostatic Test for Marine Boilers" in which he quotes French, Latin, and Chinese proverbs; claps a "Handy Billy" onto the "Fall of a Luff Tackle Purchase," and proves our boiler rules "delusive and illusive," and our Maritime law stagnant and "devoid of motion." (He still thinks that, and so does the present editor.)

World Trends in Propulsion Machinery

Very significant in relation to world shipping are the latest annual returns from Lloyd's Register of Shipping. These show, as of June 30, 1936, that the tonnage of merchant vessels burning oil is greater than the tonnage of vessels burning coal. This condition has never before existed in the long history of merchant shipping.

In June, 1935, there were in the merchant fleets of the world 63,727,317 gross tons of vessels of 100 tons and upward, of which 32,537,556 tons, or 51 per cent, burned coal, and 31,189,761 tons, or 49 per cent, burned oil. Of this oil burning tonnage 11,304,691 tons were propelled by internal combustion engines.

Compare these figures with the following for June, 1936: Total tonnage, 64,004,885; coal burning, 31,947,618 tons, or 49.9 per cent; oil burning, 32,057,267 tons, or 50.1 per cent. Of these oil burning vessels 12,290,599 tons were motor ships and 19,766,668 tons were steamers burning oil under boilers.

It will be noted from these figures that the net addition to the total world tonnage from June 30, 1935, to June 30, 1936, is only 277,568 gross tons, while the total of motorship tonnage increased by 985,908 tons. This indicates, of course, a positive decrease in tonnage of steamers. All of this decrease is in the tonnage driven by reciprocating steam engines, which fell off by 755,275 tons. Steam turbine driven tonnage increased by 46,945 tons.

This trend toward the motorship is becoming more marked each year. The tonnage of steamers fitted for burning oil fuel reached a maximum in 1932 at 20,135,006 tons, and has decreased slowly during the past four years. Ten years ago there were 18,243,539 tons of oil burning steamers in the world's merchant fleets, and only 3,493,284 tons of motorships. Today we have 19,766,668 tons of oil burning steamers and 12,290,599 tons of motorships. For the oil burning steamer an average annual increase of 152,313 tons, and for the motorship an average annual increase of 879,731 tons.

We of the United States are the only important seagoing people that have not adopted the diesel for seagoing tonnage. We are trending in preference to high pressure steam. With an important shipbuilding program just around the corner, we would be wise to reappraise the values and carefully examine the latest developments in both high pressure steam and diesel propulsion. Engineering approach to this subject, and a correct analysis of all the factors involved, will probably give us a different answer for every major trade route and will also probably save us considerable in construction and operating costs. This approach and these analyses must include the whole vessel as a unit if we are to get the maximum obtainable benefit for the least practical cost.

. . . . *New*

California Standard Tankers

Standard Oil Company of California Contracts for Two Large Tankers with the Sun Shipbuilding and Drydock Company

As of December 22, 1936, announcement is made by the Standard Oil Company of California that they have entered into a contract with the Sun Shipbuilding and Drydock Company, of Chester, Pennsylvania, for the construction of two large seagoing tankers.

The principal characteristics of these ships will be:

Length overall	462 feet, 4 inches
Length between perpendiculars	442 feet, 0 inches
Beam, molded	65 feet, 0 inches
Depth molded to upper deck at side amidships	35 feet, 0 inches
International tanker summer draft to bottom of keel	28 feet, 7½ inches
Displacement, molded, at International Tanker Summer draft	17,225 tons
Deadweight carrying capacity at I.T.S. draft	12,800 tons
Cargo capacity at 98 per cent	103,200 barrels (42 gallon)
Normal shaft horsepower	3,500
Loaded speed on trial	13 knots

These hulls will be built on the Isherwood Bracketless System of longitudinal framing with twin longitudinal bulkheads through the cargo tanks. All hull joints in way of cargo tanks are to be of a tightness sufficient to prevent any contamination when transporting different petroleum products in adjacent tank spaces.

Design, construction, and equipment of hulls and machinery are in accordance with the highest classification requirements of the American Bureau of Shipping and conform with the latest rules of the Bureau of Marine Inspection and Navigation of the U. S. Department of Commerce.

The vessels will be of the single screw, two deck type with poop, bridge, and forecastle erections. Rooms for deck officers will be in the midship deck house. The engineer officers will be in the deck house over the poop, and the crew in the poop on the upper deck level.

On each vessel the power plant will consist of a Westinghouse cross compound double reduction gear steam turbine, capable of generating 3500 shaft horsepower under normal conditions. These turbines will be of the same type that has made such an excellent record for reliability and economy on recent American built tankers such as the Gulf Belle, and on U. S. Coast Guard cutters. A full detailed description of this type of Westinghouse marine propulsion turbine and double reduction gearing will be found in Pacific Marine Review for June, 1936.

Steam will be generated in three water tube boilers at a working pressure of 400 pounds per square inch. Two of these boilers will have ample capacity for the full power requirements of the turbine, and these two will be fitted with superheaters to give the steam a total temperature of 675 degrees F. The third boiler will be built for 400 pounds pressure, but normally will work at lower pressures and mainly for port duty on cargo pumps, cargo heating coils, and other duties for which lower pressure and temperature ranges are ample.

One pump room amidships will house the four main cargo pumps. These will be operated by steam and will have a combined capacity of approximately 12,000 barrels an hour, which is very high for a tank of this size.

All auxiliary machinery on deck and in engine room will be built and installed to meet the very high qualities required by the specifications of the Standard Oil Company of California, and we can be sure that when these two tankers make their maiden voyage early in 1938 they will bring to the Pacific Coast a demonstration of modern efficiency in transport and discharge of petroleum liquid products.

Proposals for Bids

Office of Commissioner of Lighthouses, Washington, D.C., will receive bids up to January 26, 1937, for the construction, equipment, completion, and delivery at Staten Island, New York, of a single screw, steel, diesel propelled lightship. Specifications available to prospective bidders at office of Commissioner of Lighthouses, Washington, D. C., call for a vessel 115 feet by 26 feet by 12 feet, mean draft 11 feet, displacement about 420 tons, one engine 300 shaft horsepower.

HAPPY NEW YEAR

We of Pacific Marine Review desire here to express our grateful thanks for the many expressions of good will and seasonal greetings that have arrived in great profusion and from world-wide sources during the holidays. We deeply appreciate these evidences of friendship and wish to extend to all of our readers the hope that 1937 may be in every way a better and bigger year.

Silver from the Sea off

Stanley Hiller.

The history of the development of the fish meal and oil industry in California is reflected quite accurately in the story of the development of the tank steamer Lake Miraflores and the final development of the American Fisher.

Recorded data on the catch of California sardines or pilchards starts for the season of 1916-1917 and is set down as 29,430 tons. During this year 166,095 cases of sardines, containing 4,152 tons of sardines, were packed. The difference between these tonnage figures of over 25,000 tons represents waste or trimmings, and was, for the greater part, hauled out to sea and dumped. This tremendous waste was attacked in several ways. First, canning methods were improved, and for the season 1917-1918, 40 per cent of the catch was put in cans, instead of the 14 per cent for the year previous; second, fishing methods improved slightly to deliver the fish in better condition; and third, an attempt was initiated to produce fish meal and fish oil from the waste or excess fish.

This latter development is the one that Stanley Hiller, now president of the Santa Cruz Oil Corporation, became associated with. He developed specialized machinery for the sole purpose of utilizing pilchard wastes and whole pilchards, directly and continuously, to manufacture fish oil and fish meal. His machinery was developed further for carrying on a similar operation in the herring and salmon fisheries, and machinery of his design and manufacture is installed in many parts of the world.

The advent of the processing of the excess fish and the wastes to produce fish meal and fish oil brought a new source of profit to the canner. The products of his by-product manufacture were not uniformly of a high grade because of the condition of the fish. During the years of 1918 to 1921, Stanley Hiller decided that superior products could be made if they were manufactured from fresher fish, and he conjured the plan of a ship, equipped as a fish processing plant. During the early years of this industry, operated on shore and using a catch which ranged around 75,000 tons per year, there was no evidence of a shortage of the fish. All fishing was done by small boats known as lampara boats and was done close to shore. Some venturesome catches were made farther out at sea, and the quality of the fish was superior to those caught near shore. The desire to have these superior fish from farther offshore brought a new type of boat, known as the purse seiner, into the fishing. These boats were larger and faster and so could tap this new source of fish. The

The mobile seagoing fish product factory American Fisher.

California Shores

Joseph J. Coney.

purse seiner found the fish in practically unlimited quantities well offshore, and this development further convinced Stanley Hiller that a mobile seagoing factory ship was the correct answer to many problems presented in the manufacture of high grade fish meal and oil.

● First Offshore Plant.

During the years of 1918 to 1926 Stanley Hiller had an organization manufacturing and selling fish processing machinery, and he turned all the facilities of his manufacturing enterprise to equipping the Lake Miraflores for this fishing venture. As is often the case in pioneering, the obstacles to be surmounted were too great to be met and overcome with the time and resources available. Therefore, after the ship was practically completed, it was found necessary to put the Lake Miraflores to work as a tanker, and she ran in this type of service for several years. About 1929 J. J. Coney became associated with Stanley Hiller. They developed the Hillcone Steamship Company and provided additional ships for the transportation business.

The Santa Cruz Oil Corporation was again started in the fish business shortly after J. J. Coney became an officer, and during 1930 equipment changes deemed necessary were installed, trials at sea were made, and Lake Miraflores was ready for the season of 1931-1932.

Lake Miraflores has been in successful operation each season since that time, and other ships have capitalized upon the pioneering done by this vessel and are now engaged in the manufacture of fish meal and fish oil far out at sea, close to the source of the raw material.

● Seasonal Operations.

The season of operation out of San Francisco is about five and a half months. The same fish, pilchards, are available off the coasts of Oregon and Washington during the summer and before they "arrive" here. Because these factory ships are mobile they can proceed to distant points and prolong their season, giving longer employment to the men working upon them. Available fishing areas, for the successful working of these boats, may be a great deal more than is known at present. Development in methods of fishing, methods of deep sea anchoring, methods of transferring fish at sea, can change the location of this fishing operation and expand its sphere of operation tremendously.

Today the many boats in this industrial operation transfer hundreds of tons of sardines from the fishing boats to the factory ship. It is done so smoothly that hardly anyone notices how it is actually accomplished. However, this was one of the greatest obstacles during the early development, and the satisfactory solution cost a great deal of time and money. In fact, no operation approximating success was made until the method now used was devised.

● Canadian and Japanese Efforts.

The fish meal and oil industry is not exclusive to California alone. There is a large and well developed pilchard processing industry in Vancouver Island, Canada, and also in Japan. The Japanese industry is much larger in volume than our own. Reliable figures are difficult to obtain from Japan, but authentic data shows Japan to utilize over two and a half million tons per year of this fish; and they export to the United States fish meal equivalent to over 250,000 tons of pilchards, which is nearly one-half of our current production. The catch for all of California for the last two years has been 608,000 tons and 566,000 tons respectively.

The pilchard is known to be in large areas of the

Chemist testing samples aboard American Fisher. All operations are closely controlled.

seas in many parts of the world. They are described as a pelagic fish, which means they are a fish that inhabit the high and open sea. Because most pilchard fishing is conducted from a shore base, and naturally the fishermen do not go farther than necessary to catch the fish, pilchard have been associated in the minds of many people as a coastal or shallow water fish. How far out at sea these fish can be caught is only conjecture.

● Wide Market for Product.

The markets for the meal and oil products do not seem to have a saturation point. The entire production has always been marketed. The prices for the products are determined by wide market factors and, of course, are subject to the fluctuations which occur in feedstuffs and fats. The main use of fish meal originally was as a fertilizer, but for many years it has been recognized as a very valuable concentrate for poultry, dairy, and live stock feeding. The production of fish meal can be considered as having started about 1918, with a volume of about 8,000 tons, and by 1935 the California production alone had reached 80,000 tons. Fish oil finds its greatest use in the manufacture of soaps, and also finds its way into many specialized products. It is a very important ingredient for the manufacture of linoleum, oil cloth, paints, varnishes, and automobile tires.

The continued success of the Lake Miraflores, with an abundance of raw material available, and an apparently waiting market for the products prompted the Santa Cruz Oil Corporation to enlarge their operations by using a second ship.

● American Fisher Outfitted.

The American Fisher was reconditioned and outfitted during the middle part of the year 1936. Experience in past operation is reflected in the design and arrangement of machinery, quarters, and cargo space on this ship. All details entering into the rearrangement and construction were carefully laid out on the drawing board, and the various mechanical devices were ordered or fabricated before the ship was taken out of her previous cargo service. Final installation on the ship and rearrangement of quarters and other ship features was done by the Bethlehem Shipbuilding Corporation in a remarkably short time, the work requiring about seventy calendar days, during a period containing several holidays.

On this vessel the manufacturing plant is designed to handle about 60 tons of fish per hour, and is arranged to work 24 hours a day. The fish meal produced is dried by steam to produce a superior quality, and the oil is separated and purified by centrifugal separators. An account of the path of the fish through the plant will describe the arrangement and mechanical appliances in more detail.

Sardines are caught by purse seine fishing boats, which come to the American Fisher with individual loads of 50 to 180 tons. These boats are moored alongside the ship between booms and about 20 feet away from the side of the processing vessel. A basket or

Below, an aeroplane view of the American Fisher and the Lake Miraflores on station with a number of purse seiners at work.
—Photo by Clyde Sunderland.

On facing page, a close up of purse seiners alongside American Fisher.
—Photo by Meith and Hagel.

hopper with screen sides, and with a 10 inch rubber suction hose attached, is lowered from the ship and is hung on the rail of the fishing boat. The rubber hose connects to the suction of a slow speed centrifugal pump and the discharge pipe of this pump leads well above the main deck to a screen conveyor belt.

The pump is primed and started and a stream of water moves from the basket to the screen conveyor. The fishermen unload their fish into the basket on their rail and the stream of water transports them to the screen conveyor. The S.S. American Fisher is equipped with two sets of pumps and gear for unloading the fish. The pumps are Victor Kimball Krogh centrifugals driven by 60 H.P. motors. The screen conveyor effects a separation of the fish and the sea water and the fish drop into automatic electric recording scales. From the scales the fish are led to steel hopper bins on the main deck and held for use in the plant.

All fish bins are gated at intervals to draw the fish into the conveyor system, which carries the fish into the process. Cooking is the first step, and this is accomplished in a continuous cooker set on the main deck and heated by steam from the exhaust system. Cooking requires about 8 to 10 minutes.

From the cookers the fish drop, by chutes, into the presses located in the summer tanks, right and left. The presses are of the screw actuated type, and subject the fish to a "squeeze" that forces the liquid content out of the cooked fish. This liquid, called "press liquor," is drained off and is pumped into the oil separating plant.

Because of the high requirements in stress and wear resistance, all working parts of these presses were made from high test alloy steel castings. George A. Gunn, of San Francisco, supplied these castings completely machined and ready to be assembled in the presses.

Pressed fish, flesh and bones are accumulated and conveyed to a battery of Enterprise Disintegrators, in which they are very finely shredded, and then conveyed into the steam dryers.

These steam dryers are of a special design and are heated by exhaust steam. They are cylindrical shells six feet in diameter and 59 feet long, and are rotated about ten revolutions per minute on large steel tires and trunnion rollers. The dryers remove 18,000 to 20,000 pounds of water per hour from the press cake and produce a dried fish meal ready for bagging.

These dryers are covered with the famous "48" Heat Insulating Cement, which had demonstrated its high insulating quality and low maintenance costs in similar applications on the Lake Miraflores. The installation of this insulating material on American Fisher is practically a repeat order, due to satisfactory performance on the older ship under peculiarly hard conditions where other brands had failed to make good.

The meal is conveyed from the dryers to the forward end of the left summer tank and bagged and the

View of fish conveyor, showing fish in excellent condition after coming through the Victor-Kimball-Krogh centrifugal pumps that raise them from the purse seiners.

Deck view featuring one of the many variable speed drives used on American Fisher.

sacks sewed by an electric sewing machine. The sacks are then stowed in the tanks or holds forward for storage until they are discharged in port.

● Refining the Fish Oil.

The liquid portion previously referred to as "press liquor" consists of a mixture of fish oil and water, with soluble and some insoluble portions of the fish. On American Fisher this press liquor is conducted to a battery of eight Sharples Rotojectors. The Rotojector is a machine which continuously handles the liquor, producing dry marketable oil, and discharging oil free water, as well as the solids carried with the liquid. The machines are electrically timed and operated by means of relays and automatic timing mechanisms. The Rotojector centrifugal separating bowl is driven at 6400 revolutions per minute by an electric motor. This machine is the latest mechanical improvement for handling "press liquor" in this type of operation.

The finished oil is run by separate pipes to an accumulation tank and checked for quality before running it to the ship's tanks for storage, and is later discharged in port.

● Plant In Duplicate.

American Fisher was built as a tanker. She is 370 feet long, 52 feet beam, and 30 feet molded depth. The pump room is located athwartship under the midship house, and the boiler and engine room aft. The ship has summer tanks, both right and left, extending from the cofferdam at No. 1 tank to the cofferdam at No. 7 tank.

The ship is actually equipped with two plants, identical in capacity and construction, one on each side of

Fish oil is purified by a battery of the latest type Sharples Rotojectors.

the ship. The processing machinery is nearly all in the summer tanks below decks, with fish storage bins and the cookers above decks.

● High Pressure Boiler.

To successfully process fish it is necessary to have adequate and reliable sources of steam and power. The American Fisher was originally equipped with three Scotch marine boilers. The quantity of steam and power needed for the plant on this ship would have put an overload onto these boilers, and so it was decided to remove the forward, or midship, Scotch boiler and replace it with a Babcock and Wilcox water tube boiler. The boiler selected is designed for 500 lbs. operating pressure, and is equipped with a superheater and air pre-heater on the stack outlet. The heated air is delivered to the burners under pressure maintained by a Sturtevant fan and Westinghouse turbine unit. The fuel supplied to the boiler is pumped by Quimby pumps, and the regulation of the fires is done by varying the speed of the Quimby pumps to regulate the oil pressure. Constant and uniform oil pressures are essential, and the system adopted assures that.

Feed water for the boiler is supplied by Warren feed pumps and is regulated by Fisher excess pressure controlling units and through a Bailey Feed Water Level Regulator. The hot-well levels and make-up pumps are all controlled and operated automatically by Fisher regulators of proper design for the purpose.

To insure clean boiler tubes, Diamond soot blowers were installed to remove the soot from the spaces outside and around the tubes. The inside of the tubes are cared for by careful control of the water in the boiler. The well known Hall system is followed by regularly checking the analysis of the water in the boilers and adding the proper chemicals daily, or oftener, as may be shown necessary by test. After several weeks of operation the tubes show no deposit of scale and no corrosion. The Babcock and Wilcox boiler consumes in excess of 40 tons of make-up water per day, and this is raw water taken on in port. Using the Hall system, and with this large make-up, the blow down is held at a minimum and dry clean steam is delivered at all times.

In the Hall System of Boiler Water Conditioning, the conditioning chemical used for the prevention of scale formation is hexametaphosphate.

Oxygen corrosion or pitting is prevented by anhydrous sodium sulphite known as Santosite.

Thus the chief engineer, by his daily test on the boiler water, has full control at all times to meet changing conditions as they arise, whether it be a change in make up water or a salt leak contamination, as the metaphosphate will prevent scale formation due to leaky condenser or tanks.

The use of the Hall System not only saves the expense of turbining tubes, but also eliminates the expensive practice of evaporating make up feed, which would run into a considerable amount on American Fisher due to the heavy demand for make up water.

The steam and feed piping and fittings for this high pressure boiler were supplied by the Crane Co. On main steam and high pressure auxiliary steam lines

Through presses, disintegrators and driers, the fish meal finally reaches the space where it is sacked. The filled sacks after sewing and weighing are stored for market.

Crane Series 40 and 60 cast steel valves and fittings were used and Series 90 forged steel Cranelap flanges. All pipe was hot finished, seamless tubing, complying with the requirements of the Steamboat Inspection Service.

All feed lines were of the Series 60 cast steel material, and numerous other steam lines throughout the boiler room proper were of the Series 30 and 40 material. Due to the fact that available space in the boiler room was very limited, it was necessary for Crane Co. to furnish a great many valves and fittings of special nature, adapted to this job.

There was also required considerable amount of high pressure gaskets and of triplex steel studs with case hardened nuts, which together with miscellaneous forged steel screw valves and fittings for some of the smaller lines, were all furnished by Crane Co.

● Electric Plant.

The electrical power requirements for the ship are furnished by a 750 K.W. Westinghouse generator, driv-

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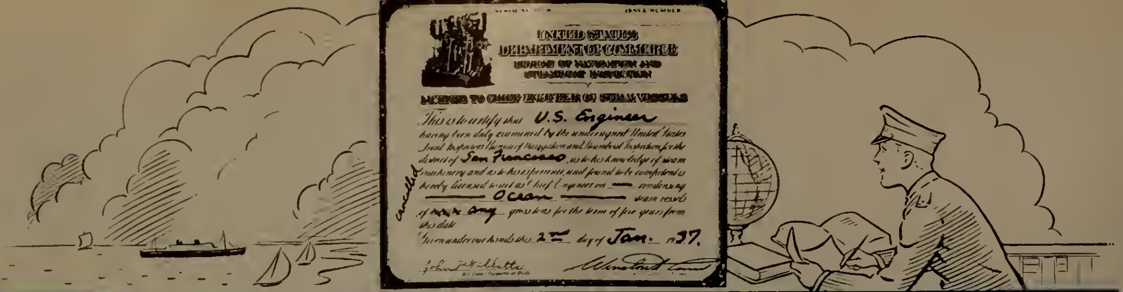


Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

The art of engineering design and operation is advancing much more rapidly than any one individual can advance. All men in every branch of knowledge find it absolutely necessary continually to strive to keep abreast of the new things, the new ideas, in their respective lines of work. Coupled with this problem, and still more important, is the development of the young man, helping him in his first steps of an engineering education.

Like air and water, knowledge is free. There is nothing of such great value which can be obtained so cheaply. It is broadcast in free schools, free libraries, inexpensive journals such as the Pacific Marine Review. It can be picked up in our day-to-day work; is strewn all around us; but, like gold, it must be recognized, refined and made part of our store.

It is with honesty of intention, sincerity of purpose, and a firm belief in the future of the marine engineer, joined with a warm, friendly appreciation of his problems, that we initiate this series of discussions dedicated to Self-Improvement.

Do you, Mr. Engineer, need self-improvement? Perhaps not. The less interest you take in this subject the more you probably need it.

Do you fail to take an interest in, or to understand the more technical articles in the engineering journals? Have you never found an error in these articles and never felt like arguing with the author? If so, you probably need self-improvement.

Try to explain some little technical detail about your engines to one of the juniors or oilers. Leading educators tell us that knowledge is not really yours unless you can impart it to another. Show him that the normal heating of a high speed bearing is really fluid friction and not metallic friction. Explain to him why the velocity of a steam jet is so much higher than that of a water jet, both at the same pressure. Or give him a good answer to one of the questions you missed at the last license examination.

● On How to Accomplish Self-Improvement

Although knowledge is free to us, it requires an intellectual effort to receive it. The basic and fundamental effort is THINKING. As we need muscular strength in our physical activities, so do we need mental strength, or ability to think, for our gain of knowledge. This does not mean to accumulate a vast store of figures and facts. Such data as you use regularly you will easily remember. You should rather cultivate a natural curiosity—seek an explanation for the technical things you see around you—examine your ideas about these things—criticize them—discard the errors—and accept with caution, subject to further review, the rest.

Stimulate your imagination so that you may be enabled to visualize the actions and reactions going on within the walls or pipes or casings of the various elements of your plant. Visualize the velocities and forces.

Be strongly critical of your own ideas and explanations, and gently, perhaps silently, critical of the ideas and opinions of others. Accept no new ideas unless you can understand them by relating to, or tying up with, facts you already know.

You are cordially invited to correspond with, and criticize this Study Club Section, point out errors, start controversial subjects in engineering, and ask questions. Constructive criticism is helpful to all; destructive criticism accomplishes nothing.

Develop a familiar and friendly mental attitude toward theory. The old timer who so violently attacked theory and turned to his "rule of thumb" opinion was long ago lost in the flood of new ideas. He failed at his first encounter with an unfamiliar situation. Correct theory is correct thinking. Mathematics is purely theoretical, yet it is the basis of all organized thinking in engineering. All things were once ideas. All machines were once merely theories. Foolish men defend their ignorance by attacking theory. Principles, the laws of physics and engineering, the basic causes, are really the tools with which the engineer operates.

Teach what you know. Give knowledge freely and it will come back to you manyfold. The teacher, invariably, learns more than the pupil. No one knows all about any subject. The more you teach the more you learn about it. Carefully answer any technical question given you. Do not fear the ridicule of your associates if you question them on a subject not clear to you, yet considered to be well understood. They laugh outwardly, but secretly admire your search for better knowledge. You soon will be telling them much they did not know, on a subject they thought they knew thoroughly.

● **On a Proposed Program to Advance Self-Improvement**

To be able to answer all the questions in a license examination does not necessarily mean complete knowledge of marine engineering. On the other hand, a well founded and broadened knowledge of the subject does mean that the examinations can be easily passed. Our goal, therefore, will be encouragement, leading the student to study—to think—to analyze—to develop his curiosity, imagination, and critical attitude of mind.

Very little space will be devoted to extensive descriptions of new plants or machines. These will be found elsewhere. Much space will be given to analyzing the various elements of the machines with which we work; presenting to the engineer the problems faced by the designer, and how these problems were solved; uncovering the reasons for things; and showing the bases for many familiar formulae. No attempt will be made to show exactly how to operate a machine, but much will be done to prepare the engineer so that he can reason and analyze and thus find his own, perhaps a better, way to operate.

Although no attempt will be made to take questions and answers from technical handbooks or other sources, questions from readers will be carefully considered and answered by discussion. Those of general interest will be published in this section. Debate on published questions is invited. We may not always be right, and we welcome constructive criticism and comment. We hope to build up a public forum—a free public market—for the distribution of technical information.

● **On Subjects to be Treated**

We will attempt to discuss in an instructive manner the many interesting and perhaps least understood points on the following general subjects, bringing out the problems faced by the designer, the limiting factors, and reasons for the different procedures. Although, in general, the marine applications of the subject will be treated, there will be some attention given to general applications, shore plants, and basic principles, which, of course, apply to both.

● **The Steam Turbine**

Steam flow through nozzles.
Blades, buckets, and nozzle shapes.
Rotors, shafts, packing, diaphragms, casings.
Balancing, static and dynamic vibrations.
Bearings and lubrication.
Control, valves, governing.
Gears and speed torque valves.
Electric drive for ships.
Some facts on economy of operation.
Auxiliary and exhaust turbines.

● **Condensers**

● **Auxiliaries, their Selection and Drive**

● **The Ejector and Injector**

● **Steam Boilers**

Safety valves and other fittings.
Fire side.
Steam side.
Advanced designs in boilers.
Boiler feed water and treatment.
Oil burners.
Fuel Oil.

● **Practical Heat Engineering**

Temperatures.
Expansion and contraction, how to use.
Gases and steam.
Practical heat (cont.).
Energy relations of expansions.
Steam cycles and efficiencies.
Heat analysis of complete plant.

● **Electricity**

Some fundamental conceptions.
DC motors and generators.
Control of motors.
AC motors and generators aboard ship.
Operating and maintenance procedures.
Measurements and instruments.

In treating these subjects, we ask for the patience and consideration of the older and better prepared engineers if they find material which to them is too elementary. Perhaps they will be indirectly benefited by a broadening of the understanding of their assistants. Also, by careful selective reading, they will find a portion of the material of interest.

● **On Some Fundamentals**

Energy is referred to regularly in engineering literature. Energy in its technical and physical sense is nature's gift to man. It is the ability to do work; to overcome its opposite, friction. It can be measured—bought and sold—used. It can neither be created nor destroyed by man. It exists in many forms, such as electric, mechanical or kinetic, potential or stored up, chemical, magnetic, heat, light or radiant. It can be transformed from one form to another. While being transformed it is called work; when a transformation is complete, it is called work done. The most common transformation is that of overcoming friction, in which we have energy in the form of motion changing to the form of heat. Another important change is that from the form of chemical energy in fuel to the form of high grade heat.

Although never destroyed, energy is nevertheless changed from a useful or high grade form to a useless or degraded form. The high grade heat energy liberated from the fuel by combustion is all, every bit of it, eventually degraded to the same amount of energy at low or useless temperatures drained off to the great store of atmospheric and terrestial heat.

The mechanical unit of energy is the foot-pound (ft.-lb.), the ability to lift 1 lb. weight a vertical distance of 1 foot or exert a force of 1 lb. through a distance of 1 foot. The heat unit of energy is the British Thermal Unit, equivalent to 778 ft. lbs. The electrical unit is the watt hour or, more usually, the kilo-watt hour (K.W. hr.) equivalent to 3412 B.T.U., hence equivalent to 2,654,536 ft. lbs.

All energy used by man came originally from our sun, and eventually is radiated off into space. Thus we use it by lowering it or degrading it through processes of transformation. Our duty as engineers, then, is to learn to use it most effectively and with the greatest economy.

In subsequent issues we will show how all our engineering is a transformation of energy by allowing a certain force to move through a given distance at a predetermined velocity under our control.

An Open Letter To American Ship Officers

Of Vital Interest to All Merchant Marine Licensed Personnel

By the time this article is published, I am hoping that our present troubles will have been ironed out to everyone's satisfaction and we are all back on the job —the job of running our Merchant Marine as it should be run.

During the long lay-off I have had chances of talking over my pet subject with a great many of my friends in our own profession. My subject is, "What is the reason that the marine officer is not honored and respected as men of any other profession, such as doctors or lawyers, etc?" My contention is that it is entirely our own fault, and I speak from my own personal experiences as a old marine chief engineer, having sailed on both passenger and freight vessels, holding both Steam and Diesel Unlimited.

This article will deal with all licensed personnel, and I hope you gentlemen will take it in the spirit in which it is written, the purpose being to benefit us all by a little suggestion and criticism.

Having sailed to many foreign countries and met quite a lot of foreign ship officers, I have compared their conditions with ours, especially the way they are treated aboard their respective vessels and the way they are respected. Also, I have visited at some of their merchant marine officer clubs, and believe you me, it impressed me very much to see the respect they demanded and received, whereas we here are just looked upon as one of those things; but, gentlemen, this is entirely our own fault.

How can we expect respect from others when we do not respect ourselves or hold any admiration for our jobs? How can we expect our employers to show consideration and respect for us under these conditions?

Visiting most any foreign vessel, the first thing that meets your eye is the officers on deck in uniforms, and probably a quartermaster in uniform at the gangway, who gladly shows you to the person you want to see. Call on the chief engineer and you will invariably find him in uniform if he is not in overalls inspecting down below. See how quick the mess boy answers the bell when he is called, and notice the service officers get when refreshments are served. Notice also that none of these officers have to hide the bottle. They all know how to drink even though they are on the job; in fact, drinks are served with the meals, if desired.

Notice also that they can invite any friends to lunch or dinner without having to get permission from the captain or steward or owners. No one would think of entering their respective rooms without first knocking and being asked to enter, and then the hat would come off.

Foreign officers seem to have no troubles with the crew, and I believe that this is due to the officers holding their positions with the dignity. They respect their own rank and expect and get others to do the same.

EDITORIAL NOTE:

This letter came to us from a chief engineer of long and wide experience who is now working shoreside. We are printing it just as it came from the brain of a man who is evidently motivated by a sincere desire to help the licensed personnel on American ships. With the principles set forth in this letter we agree 100 per cent, and we hope that every officer in the Merchant service will read it carefully and think it through.

We do not have this on most of our ships, but we could have it if we ourselves practiced self-respect and dignity. By impressing both owners and crew alike with our self-respect we could demand their respect and I am sure it would be given.

Stop to think how long it has taken you to get to your present position; how many hours of hard study you have put in and how you have to study to keep up with modern improvements. Then compare this with our up to date physician. The human body is the same today as when we were born, and when we consider the specialists they have their job is nothing as compared to the up to date marine engineer. Do you gentlemen ever stop to realize the importance and magnitude of your respective positions? Do you ever stop to consider the amount of money your owner has invested in your vessel and the lives of passengers and crew you are responsible for? I wish you would stop and think this over, and then see if your position does not demand respect and honor. If we could only impress ourselves it would be easy enough to impress both the owners and the crew, and we could demand the owners at least give us conditions that are comparable with those enjoyed by foreign officers.

Why cannot we start the ball rolling here in San Francisco by establishing a merchant marine officers' club with no one but a licensed officer allowed in, except when invited by a member? Run this club along the same lines as the club is run in Liverpool and London. When these boys attend their dinners it is fish and soup and nothing else but. These are dinners attended even by royalty and owners, and believe you me, the merchant fleet officers are respected and admired by all. They demand this and get it. When these gentlemen arrive in port and have any appointment they gengenerally say "See you at the club, old chap"; we generally say "See you at the corner saloon." They go to the club and sit in easy chairs and lounges, take a snack or meal, as desired, play billiards or pool or read, write or do what they like. They have their own bar and

do not have to go to the corner saloon and be bummed for drinks which generally happens, especially along the front. They pay less for their drinks than the average club charges. When we go to the corner saloon we generally find some of the crew and naturally the word gets back to the ship, something like this: "Say, I just saw the ——— in Paddy's. Boy did he have a load on, and did he have a sweet mamma along!" and so on. Naturally, this lowers you in their estimation and lowers their morale and feeling toward you. The same idea applies when you get too friendly with them aboard.

I want you to give consideration to the following: When ashore we have no meeting place of mutual interest, no place where we can meet our friends and relatives, no place to stay at night without paying excessive hotel bills. We have no place to receive mail, only through the company office, and sometimes we have mail that we do not desire to go through that office or be handled by them. Again I say this can be overcome by starting the club and inviting all naval officers and coast guard officers to join us, and inviting officers from foreign vessels to make it their home while in port. It would be understood that no one connected with any steamship company on shoreside, such as port engineer or port captain, could hold any office on the Board of Directors, but we would invite them to join us; in fact, it is desirable to have them and also the owners. Then when they see how we take care of ourselves, and the conditions we have ashore, it would be a easy matter to impress the owner with the importance of carrying out the same idea at sea for the benefit of all concerned.

I believe that the owners, seeing this, would get a great deal of respect for us and try and help in every way.

When the Steamboat Inspection hold us to the oath we all take regarding the protection of life and property at sea as well as ashore, and when we consider just what they and our government think of us to entrust this responsibility to us, we at least should uphold this responsibility and trust, and never give them a chance to think that we are anything but what we are supposed to be, officers and gentlemen of the U. S. Merchant Marine. Let us act as such in every thought and deed. Let us force the owners to recognize us as such.

Let us uphold our positions and responsibilities; then the owner would have to give us the recognition we would so richly deserve. We cannot get this recognition now because we do not recognize ourselves as being a little superior to the average citizen.

I am asking your unbiased opinion on this subject. If this Officers' Club can be put over, it would at least accomplish one thing; that is, it would bring the deck and engine room departments closer together, a thing that should have been done long ago. It would be a place where we could exchange thoughts and ideas free from owners or unions; a place where we could relax and just be ourselves, without outside interference.

It would become international and the feeling of brotherhood and good fellowship would be extended to all foreign vessels. In fact, it would be a definite connecting link in world peace and international understanding. Imagine, if you can, what the possibilities are, with such a club in every major port of the U. S. In a very short time we would have the support of every licensed officer in the world.

We could make arrangements with reputable stores to supply officers with their requirements at reduced prices upon presentation of membership card. News concerning club activities and for a list of officers and their addresses would be published and mailed to members so that we will all know just where we can contact each other.

Gentlemen, I again ask your unbiased ideas and thoughts and suggestions on the foregoing. Remember that no one connected with any steamship company in any shoreside official capacity would be allowed to hold office of any kind at any time; no one but licensed personnel, coast guard officers, and naval officers would be allowed to be members; the Board of Directors would be marine licensed officers elected by majority votes of the membership; and the club managers would be old marine licensed officers appointed by this Board of Directors. Profits, if any, after expenses are paid, would be turned over to some worthy marine charity organization.

I do not believe that our dues would have to be over $5.00 per year after we get going and have things running smoothly; probably we would have to put up $10.00 or more for the first year's dues, and then, when we are fully operating, this could be returned to us; or we could start off with $5.00 and charge the same as outside places until we do catch up and have a little in reserve, then we could reduce our charges to a point that would more than attract members; anyway, it would not be long before such a club would be self supporting and operating at a profit. The writer will give all his spare time to such a movement, and you gentlemen may rest assured that he is not trying to make a job for himself, as he has a real job now with a real company and is well satisfied.

Come on, brothers of the deck and engine departments, let us show the owners we do respect ourselves and expect them to do likewise. Let show them we are gentlemen and officers and as such we demand the respect of all concerned. I can assure you that not only the owners but our government would give us the support we so richly deserve. You can rest assured that I know whereof I speak, and that the subject has been discussed with a great number of merchant marine licensed officers, who agree with me that we should have such a club for ourselves and for the benefit of ourselves only. Do not send any money. Nothing can or will be done until we have approval of the foregoing in principle from at least 75 per cent of you. The corners can be ironed out and adjusted when we have your approval. Come on, gentlemen! let's pump bilges and scrape our bottom, apply a real coat of protective compound, and keep ourselves looking as we should, as officers and gentlemen! Thanks, boys, come on, sit down and drop a card or letter approving this in principle; your letters will be kept on file and you will be notified of further developments. Thanks again.

A well wisher and an ex-marine licensed officer.

Address your cards or letters to:

Officers' Club
Room 701
500 Sansome Street
San Francisco, California

The New Steamotive

Complete Steam-Generating Unit of New Type Announced Jointly by General Electric, Babcock & Wilcox, and Bailey Meter Companies

The design and testing of a new type of steam-generating unit of good efficiency, relatively light in weight, and requiring a minimum of space, was described jointly by the General Electric, Babcock & Wilcox, and Bailey Meter companies at the annual meeting of the American Society of Mechanical Engineers, in New York City, November 30, in an interesting paper jointly prepared by E. G. Bailey, of the Babcock & Wilcox Company; A. R. Smith, of the General Electric Company; and P. S. Dickey, of the Bailey Meter Company.

The new type of steam-generating equipment has been named the Steamotive. In it, steam is generated at high pressure and temperature—and fully automatic control in response to changes in demand has been incorporated. The units are intended for capacities of from 2,000 to 10,000 horsepower.

Two such units have already been built. The first, now in service in the Lynn, Massachusetts, works of the General Electric Company, is used to test marine and other small turbines. It has an output of 21,000 pounds of steam per hour at a pressure of 1,500 pounds.

Another, a completely coordinated power-generating plant incorporating the Steamotive and turbine-generator, with a capacity of 10,000 pounds per hour and furnishing steam to a turbine at 1,200 pounds per square inch and 950 degrees F., is being installed in a small, isolated plant of a large industrial concern to supply electric power and low-pressure steam for building heating. Both are oil-fired.

Two oil-fired Steamotive units, each with a capacity of 40,000 pounds per hour, are now being constructed for the Union Pacific Railroad for driving two 2,500-horsepower electric locomotives, it was announced at the meeting. These units will furnish steam to the turbines at 1,500 pounds per square inch and 950 degrees Fahrenheit.

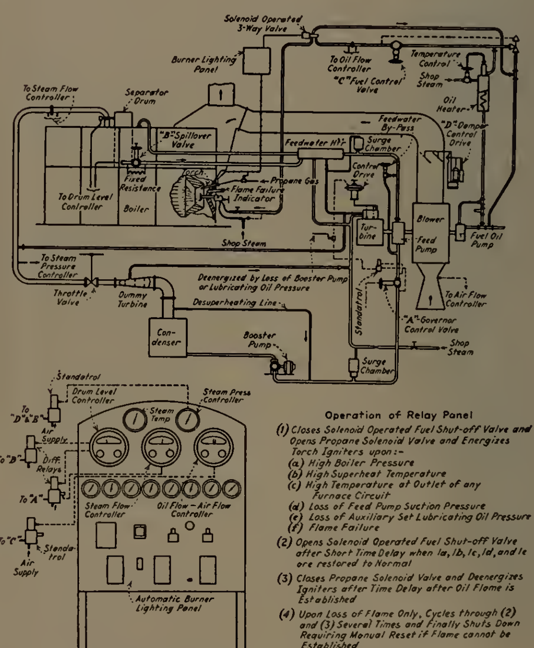
Indicating the compactness of the Steamotive unit, the one for Lynn was shipped complete from Schenectady on a railroad flatcar.

Objectives sought in the design of the new equipment were: high steam pressure and temperature, minimum weight and size per unit of steam produced, wide range of capacity with ability of the unit to respond quickly to wide variations in load conditions, adaptability to wide range of fuels, completely coordinated auxiliaries, completely coordinated automatic control, and units of simple design and constructed in sizes small enough to be portable.

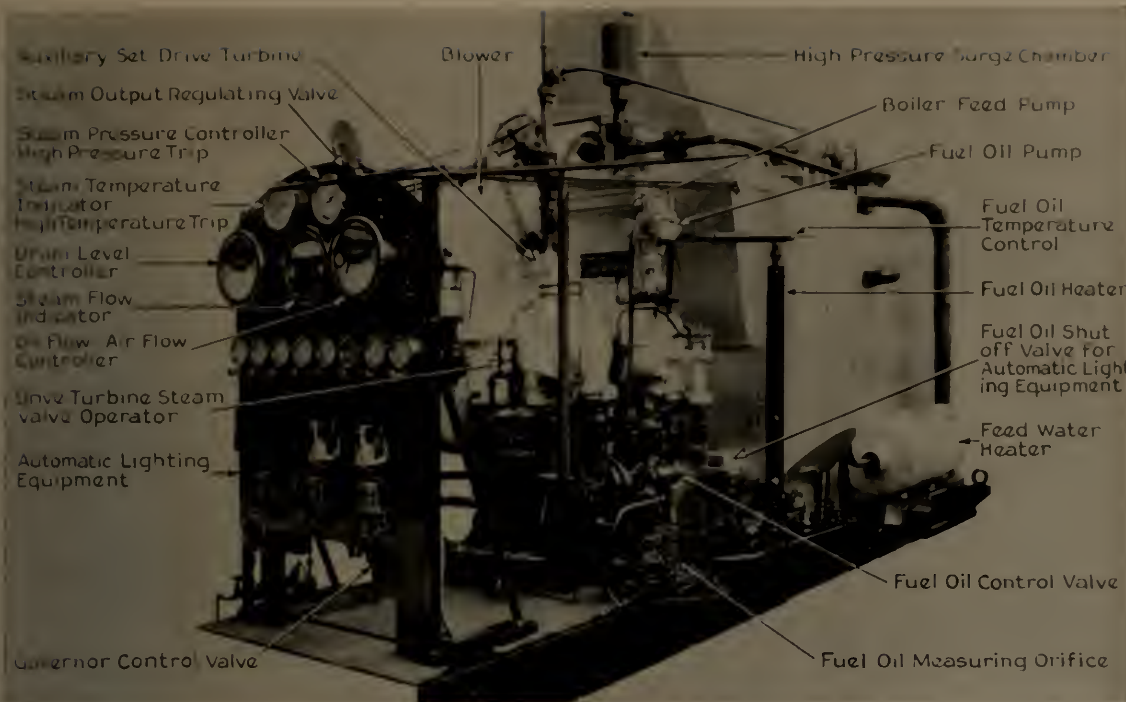
Answering these specifications, the Steamotive boiler was designed and built by The Babcock & Wilcox Company at Barberton, Ohio. The meters and complete automatic control were designed and built by Bailey Meter Company, Cleveland. The auxiliaries which supply fuel, air, and feedwater are controlled in accordance with demands for steam. Complete automatic ignition and safety equipment are included.

The auxiliary set was designed and built by the General Electric Company, which company also did the assembly work of the complete unit at its Schenectady plant. The auxiliaries, geared together as one turbine-driven unit, in the case of the unit at Lynn consist of a feed pump delivering 25,000 pounds of water per hour at a pressure of 2,000 pounds, a blower for 30,000 pounds of air per hour at 60-inch water pressure, a fuel-oil pump, and a lubricating-oil pump. The complete Steamotive unit was designed and constructed so as to be suitable for installation in a locomotive in conjunction with turbine-electric drive installed by the General Electric Company.

In the operation of the Steamotive unit, the flame and gases pass from the burner through the completely water-cooled furnace, thence into the superheater, flowing around the separator, through the economizer and air heater, and up the stack. The air for combustion leaves the blower at relatively high pressure, passing through lanes intersecting the stack, and down around the air-heater tubes to the oil burner. There is



Diagrammatic layout of the Steamotive.



Photograph of Steamotive developmental unit with principal details named.

no induced draft fan, the blower forcing the air through the burner and furnace under pressure.

The feedwater enters the economizer inlet header and, after leaving the outlet header, is divided into several circuits, all of which form the floor, sides, and roof of the furnace, as well as the sets of loops forming the boiler screen. All the steam is generated in these furnace and boiler circuits, and enters the separator with a surplus of water in each circuit. From the separator the dry steam goes through the superheater and directly to the main turbine. The water from the separator is called the spillover, and it passes through a heat exchanger to the hot well, where it mixes with the condensate, and is refed to the boiler by the feed pump.

Due to the compact arrangement of the Steamotive unit, it constitutes what is practically a packaged power plant.

The authors of the paper summarize as follows:

"Tests made on the developmental Steamotive unit, and subsequent design studies, indicate that a steam-generating unit of this type is entirely practical for generation of high pressure and high-temperature steam. The principal advantages of this type of unit over natural-circulation boiler installations are the small space required and the reduction in weight of the unit. It is possible to fit this type of boiler into a restricted space and the design is flexible in its adaptability to limits in height, width, or length.

"The elimination of refractory in the furnace and boiler setting, replaced by waterwalls and insulating block, not only results in a large saving in weight and volume, but also in reduced heat capacity that materially affects the ability to change output quickly. The small water content of the forced-circulation boiler results in quick response to load changes and insures safety in spite of the high- temperature and high-pressure steam conditions. These factors permit quick starting from a cold condition, requiring less than ten minutes from lighting the burner to full output. It has been found that combustion liberation rates up to 400,000 B.t.u. per cubic foot per hour can be obtained with low excess air and smokeless combustion with oil fuel. The pressure furnace which utilizes forced draft only is entirely practicable and materially simplifies the draft equipment and control therefor.

"The wide-range burners used on this unit and the coordinated auxiliary set make complete automatic control a thoroughly practicable device. Completely automatic lighting of the burners has been entirely satisfactory, and the use of safety devices which automatically cut off the oil fire has proved a more effective protection than safety valves and other protective devices common on natural-circulation boilers.

"It is essential that the application of a unit of this character be carefully considered, since reduction in weight and space requirements can only be obtained through increase in auxiliary power and reduction of plant efficiency, especially at high loads. In certain applications the problem is simple, since the space requirements are definitely fixed. However, where space is available, it is generally more economical to use a larger unit, improve boiler efficiency, and reduce auxiliary power."

The New Crankless Diesel

Sterling Engine Company are Now Placing Their New Diesel Engine on the Market in a Four Cylinder, 150 Horsepower Unit of Revolutionary Design, Claiming Many Advantages

The Sterling Engine Company, of Buffalo, New York, have now marketed an oil burning engine which they have had under development for the last five years.

Started by Charles A. Criqui, president, 35 years ago, throughout that period Sterling, under the guidance of Mr. Criqui, has been a leader in the development of gasoline marine and commercial engines for generator and pump drives, as well as for other commercial uses. Sterling driven generator sets power many of the larger rail cars, which are to be seen in daily service on railroads throughout the United States.

Sterling engines power the three Portland fire boats, the Tacoma fire boat, and the Vancouver, B.C., fire boat on the Pacific Coast; also a New York fire boat, and many others on the East coast with which our readers are familiar. They are found in large numbers in the oil fields, driving generators for oil well drilling; in numerous municipal pumping plants; and other services where absolute reliability and continuity of operations are the first requirement.

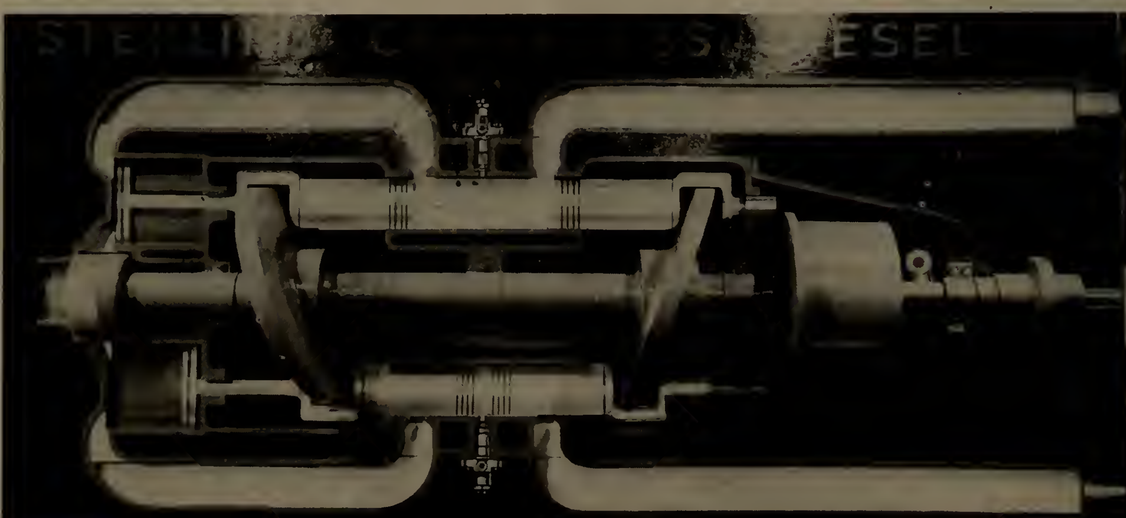
The U. S. Army Arsenal at Benicia is protected by a 250 KVA, 200 kilowatt 1200 R.P.M. Sterling generating set with automatic starting equipment, this set starting automatically on failure of Central Station power, and shutting down on resumption of service. Of particular interest is the fact that a similar automatic generating set of 150 kilowatt capacity, powered with a six cylinder, 330 H.P. Sterling will protect the new Golden Gate Bridge. Incidently, the draws on the San Francisco Bay Bridge at San Mateo and the Dumbarton Bridge are operated by Sterling engines. Also, the Southern Pacific Railway Bridge at Carquinez has a Sterling engine power unit for operating the draw in the event of failure of electric service.

All of our readers are familiar with the Southern Pacific Golden Gate diesel ferries, of the Mendocino type, there being six of this type of vessel each having Sterling driven auxiliary generating sets. Also the older wooden boats of this fleet are similarly powered with Sterling auxiliary generating sets.

Many of the finest yachts and motorboats on the Pacific Coast are Sterling powered. Among the notable yachts on San Francisco Bay are E. M. Mills' (vice president of the Crown Zellerbach Coporation) twin-screw yacht Memory; William Ford's twin-screw Arequipa; the Gertrude, formerly owned by Newton Neustadter and now owned by W. A. Reubold.

● Diesel Developments

During the years of development of the Sterling gasoline engine the Sterling Company developed a number of diesel models, but put none of these on the market. Relative to these earlier developments of Sterling dies-



Schematic diagram showing operation of Sterling crankless diesel engine.

Reciprocating and rotating parts of Sterling crankless diesel.

els, Mr. Criqui stated some years ago that "they were no better and no worse than the leading diesel engines then on the market, and subject to the same troubles and ills. Until Sterling can produce an oil engine as reliable as the Sterling gas engine, we will not put a diesel on the market."

A remark made by one of the leading marine repair houses in San Francisco is pertinent. This was "... a Sterling engine will run on its reputation."

Considering the performance obtained from the Sterling gasoline engine, and that Mr. Criqui expects equivalent performance from the new Sterling oil engine, as indicated by his releasing the new engine to production and sale, after his extreme conservatism in the past, it is apparent that shipowners have something to look forward to for auxiliary generator sets, either for continuous service for auxiliary power, with generator set located in the engine room, or for standby auxiliary service in accordance with the new safety legislation, which requires an auxiliary set for wireless and lighting service, located well above danger of flooding in an emergency.

The new oil engine has a continuous duty rating of 150 H.P. at 1200 R.P.M. As indicated by the accompanying photograph showing the installation of two of these engines in the 62-foot yacht Silver Heels, the engine is pleasing in appearance, compact in size, with a much lower headroom requirement than engines of the conventional type developing the same horsepower and speed.

● **The Crankless System**

The Sterling Oil Engine, which is called by its manufacturer "Sterling opposed piston crankless compression ignition oil engine," is, as its name indicates, of the opposed piston type, two pistons operating in one cylinder—combustion taking place between the pistons—one piston acting as a cylinder head for the other. Pure air is compressed between the two pistons to approximately 500 pounds compression pressure, at which pressure the temperature of compression is sufficient to fire the oil, which is injected at top dead center. The combustion of this oil forms an expansive gas, which forces the pistons apart. The above action is similar to the action of the well-known slow-speed Sun-Doxford diesel, which engine has an enviable reputation among shipowners, for its reliability and smoothness in operation. In both the Sun Doxford and the Sterling oil engine the expansive force of the gas acts equally on both pistons in the same cylinder, so that these forces are balanced.

However, the Sterling, instead of transmitting the power from the pistons through connecting rods and a multiple throw crankshaft, is built under the Michell patents (the Michell thrust bearing is the English equivalent of the well-known Kingsbury thrust bearing used in this country), and transmits the power by means of slipper pads to discs with hardened steel surfaces, which discs are mounted on and rigidly fastened to the main drive shaft.

The slipper pads have babbitted faces, and ride on an oil film. Four oil nozzles spray lubricating oil under pressure directly onto the disc ahead of the slipper pads, the oil being picked up by a wedge action, as in the Michell thrust bearing, so that the slippers do not make a metal to metal contact.

As the shaft rotates the discs attached to it rotate, forcing the pistons to top center or compression position, at which point the oil is injected, burns and expands, and forces the pistons out, causing the discs to continue rotating. Original start of rotation is obtained through electric motors, the engine being equipped with two electric starters, either of which, driving through Bendix countershaft drive, have sufficient power to start the engine.

The babbitted slipper pads are carried on bridges, which ride on two bridge guide rods. These guides hold the bridge and attached slipper in proper position, and absorb the tangential component of the piston thrust, removing such thrust from the cylinder walls. As the slipper pads carried by the bridge are connected to the piston by means of ball and socket joints, the pistons

The cruiser yacht Silver Heels, powered with two 150 H.P. Sterling crankless diesels.

take their own center in the cylinders, and the cylinders are never subject to side thrust, which is a material source of cylinder wear in the conventional type of diesel.

As will be noted, the cylinders are grouped in a horizontal position about the main shaft, compressing and firing successively. Thus there is an even flow of power and a much smoother torque curve than can possibly be obtained by a vertical type of engine. The reciprocating parts themselves, due to the method of transmitting the power from piston to main shaft, increase the flywheel effect of the rotating mass.

● Scavenging Air

Scavenging air is supplied from compressor pistons driven by the power pistons, the power piston on the compressor side of the cylinder acting as a discharge valve for the compressor and uncovering the scavenging ports in the cylinder at the bottom center. The air intake to the compressor cylinders is controlled by a single rotary valve mounted on ball bearings, with a positive clearance in the valve housing, so there can be no wear at this point. This is the only valve in the engine aside from those in the fuel injection pump.

It is to be noted that the exhaust ports in the power cylinder are on the opposite end from the intake or scavenging ports, and are uncovered by the opposite piston. This provides unaflow scavenging of the cylinder, the scavenging air sweeping the burnt gases ahead of it, so that when the compression starts only pure air is left in the cylinder. Further, as the slant disc driving the piston on the exhaust end of the cylinder is stepped about 20 degrees ahead of the other disc driving the opposite piston, the exhaust port opens this amount ahead of the scavenging port, dropping the pressure in the cylinder to approximately atmospheric before the scavenging port is uncovered. When this port is uncovered, the scavenging air enters at a pressure of 4 to 5 lbs. with a swirling motion, due to the shape of the intake ports, and the turbulence thus created materially aids combustion. Because of the closing of the exhaust port prior to the closing of the intake or scavenging port, a certain amount of supercharging is present in the cylinders.

● Perfect Combustion

That the system of combustion is satisfactory is evidenced by the exhaust, which is absolutely clear at all loads; by the fuel consumption, the engine requiring less than .43 lbs. per brake horsepower hour at full load including the driving of auxiliaries; and by the fact that perfect combustion is obtained with none of the diesel "ping" noticeable in many small diesels, yet without the use of a precombustion chamber of any kind.

The exhaust temperature at full load rating of the engine, which is obtained with a brake M.E.P. of 80 pounds per square inch is but 550 degrees.

Incidentally, the writer has seen logs of these engines, where two of them were operated for months, driving the same generator—both engines operating at the same time—in which the exhaust temperatures of all cylinders in both engines did not vary 25 degrees, showing an absolutely equal balance of load between both engines, and all cylinders of both engines.

A study of the diagrammatic photograph produced herewith, with the above explanation, will make the operation of this engine clear. There is also produced a photograph of the working parts of the engine, showing the pistons, main shaft and slant discs for the two opposite cylinders, the pistons for the other two cylinders not being shown. The simplicity of this engine is apparent.

● Advantages Claimed

Among the advantages claimed by the opposed piston crankless type of engine are:

One of the 150 H.P. Sterling crankless diesels on the yacht Silver Heels.

1. Elimination of complicated cylinder head castings, always a possible source of trouble in diesel engines.

2. Elimination of exhaust and intake valves, which require periodic regrinding.

3. Elimination of push rods, cams, rollers, rocker arms, essential to valve operation in four cycle engines, or two cycle engines with exhaust ports in the head, or valve controlled auxiliary scavenging ports.

4. Elimination of cylinder head gaskets subject to high compression and combustion pressure.

5. Reduction in cooling water requirements for proper cooling, due to absence of water cooled cylinder heads.

6. Positive valve timing, as the intake and exhaust ports are controlled each by its respective piston.

7. Better combustion, due to unaflow scavenging, turbulence, etc.

8. Absence of precombustion chamber, found necessary to eliminate "diesel ping" and obtain good combustion in other small diesels.

9. An efficient **valveless** scavenging pump, inherent in the engine, positively driven and timed.

10. Elimination of side thrust on cylinder walls.

11. Elimination of tensile stresses in cylinder castings.

12. Balanced forces of combustion, due to opposed piston construction.

13. Elimination of connecting rod bearings and connecting rod bolts under tension. Pressure is always against discs, with no reversal of stresses.

14. Greater effective bearing surface under slipper pads, with wedge film lubrication (The Michell patent) than in conventional connecting rod bearing—in which a great portion of the projected area is ineffective.

15. Positive setting of clearance under the pads by means of "feelers," with no hit or miss guess work.

16. Elimination of multi-throw crankshaft with many points of weakness at the webs of the various crank throws, and with numerous main bearings requiring careful alignment. The Sterling shaft is one single large diameter turned forging of ample strength, carried in three main bearings, lubricated under pressure.

17. Lower head room and less space requirement.

18. A more accessible engine. Pistons can be removed and replaced by merely removing side plates, with no disturbance of the rest of the engine. Cylinders can then be removed and replaced without disturbing any other parts except the exhaust manifold casting attached to the cylinder being removed.

19. Complete enclosure of accessories by readily removable covers.

20. Elimination of high pressure starting compressor separately driven, high pressure air storage tanks, etc., the engine being equipped with two electric starters with Bendix drive, either of which is of sufficient capacity to start the engine.

21. Lower installation costs because of smoothness and lack of vibration reducing foundation costs, and the fact that engine is furnished complete with all accessories.

22. Lower maintenance because of elimination of cylinder heads, valves, gaskets, connecting rod bearings, bolts, etc., which have been the major items in diesel engine maintenance in the past.

In addition to the 150 H.P. engine now going into production, two larger models are expected to be in production within the year.

A New Line of Gate Valves

A new line of standard iron-body wedge gate valves, which has been developed by The Kennedy Valve Manufacturing Company, has several features which interest engineers and other users of valves.

The metal in these valves is of a particularly dense structure, and on test by an outside laboratory has proved to be more than 50 per cent stronger than ordinary cast iron. To further insure strength and rigidity, the bodies are of oval section with well-rounded corners, the flanges and bolts are heavy, and ribbing is provided at the flanges on the larger flanged-end valves and at the yokes and caps of outside-screw-and-yoke valves.

There are no studs at any part of the valves, and all bolts have the nuts above the flanges and with ample room for standard open-end wrenches. In addition to this feature of convenience, both non-rising stem and outside-screw-and-yoke types have special provisions to facilitate repacking. For example, the latter type has eye bolts at the stuffing box which swing out of the way, with washer nuts which eliminate the annoyance of loose washers, packing gland with slotted flange bolts, and shelves on the inside of the yoke to hold the gland out of the way. The stuffing-box bolts and nuts are rust-proofed to prevent corrosion.

An additional feature of special interest is the use of heavy bronze bushings wherever the stem passes through a cast-iron part, as at the yoke cap, packing gland, and stuffing box. These bushings prevent corrosion and scoring of the stem, which might make operation more difficult and wear out the packing quickly.

The screwed-end valves have round ends for best distribution of metal, and lugs for convenient application of pipe or chain wrench. Handwheel rims are of oval section, and have only five spokes, permitting ample room for the operator's hands even if gloved.

The discs are reinforced with interior posts, are self-draining in any position, and are reversible and interchangeable. Stems have acme standard threads with thread contact surface at least $1\frac{1}{2}$ times the stem diameter. Special provisions in both non-rising stem and outside-screw-and-yoke types keep the stem in perfect alignment at all times.

These valves are made in all standard sizes from $1\frac{1}{2}$ inches to 60 inches for steam working pressures of 150 pounds and water working pressures of 200 pounds.

Pacific International Trade

Culled from Recent Reports of U.S. Department of Commerce and Various Other Sources

● **Strike Stifles Pacific Shipping**

That Pacific International Trade feels in a very vital way the disastrous effects of the tie-up of Pacific Coast ports, due to maritime labor difficulties, is indicated in two recent Federal releases to the press. The first of these, from the United States Maritime Commission, is dated December 2, and concerns a letter received by that body from Alfred Kohlberg, Inc., importers, at 1 West 37th Street, New York.

The text of the Kohlberg letter follows:

"We import embroidered linens, handkerchiefs, gloves and silk piece goods from China and have for many years been loyal shippers on the American Mail Line and the Dollar Line, both via Panama and for overland rail shipment.

"Two years ago our shipments were held up on the Pacific Coast by a strike with which we had no concern, causing cancellations by our customers and severe losses. This year the same thing is happening to us while we see competitors who have been using the somewhat faster Canadian Pacific services receive their goods while ours are tied up all around the Pacific Coast, as our holiday season passes and our customers cancel on account of non-delivery.

"We have no interest in the issues of the strike on the Pacific Coast and the parties at interest in that strike apparently have no interest in our affairs. What the issues are and where right and justice lie, we do not know, **but in view of the lack of interest in our affairs by the shipowners and strikers, we have made up our minds in the future to ship via foreign services where these stoppages appear to be less frequent than in the American shipping service.**

"We are addressing your Commission as official overseers of the American Merchant Fleet to ask you whether our decision, in your opinion, is a sound one."

The text of Admiral Wiley's reply follows:

"The Commission regrets your predicament. You are not alone in it as we have received **similar letters from many American shippers and others whose business has been dislocated by the Maritime strike.** However, we believe it beyond our province to say whether or not your decision in the circumstances is a sound one. The Government is striving to effect an early settlement of the present dispute and bring about the establishment of a permanent peace in the shipping industry which will eliminate the distressing conditions to which you refer.

"In the meantime we bespeak your patience and continued support of the American Merchant Marine."

The second release is from the Panama Canal and shows the effect on canal revenues, which have dropped more than one-half million dollars a month. The statement from the Canal follows:

"Because of the tie-up of many vessels at Pacific and Atlantic Coast ports during the maritime strike, the Panama Canal suffered a decrease of 23.65 per cent in the number of ships that passed through the waterway in November, as compared with October. Tolls for November were $593,703.98 less than those for October, and $308,766.32 less than in November of last year.

"During October 368 ocean-going and 67 local commercial vessels under 300 net tons (Panama Canal Measurement) transited the Canal. Tolls on the ocean-going ships aggregated $1,488,054.25, and on the local vessels $3,331.03, a total of $1,491,385.28.

"In November the daily average number of ocean-going commercial vessels passing through the Canal was 12.27 and the daily average tolls collection was $49,601.81, as compared with an average of 15.55 vessels and $67,153.49 in tolls for the previous month, and an average of 13.93 vessels and $59,894.02 in tolls for the month of November, 1935.

"The average amount of tolls paid by each of the ocean-going commercial vessels last month was $4,043.63, as compared with $4,298.61 for the equivalent month last year. Compared with October of this year, there was a decrease in November of 21.09 per cent in the average daily number of ships that went through the Canal and 26.14 per cent in the daily average amount of tolls collected."

● **The General Steamship Corporation monthly Freight and Charter Marketing Report for December 1 emphasizes the effect of the maritime strike**

"Since our last report of November 1, United States Pacific Coast ports have been tied up by a general maritime strike. A complete paralysis of shipping and a partial paralysis of allied industries has been the result, with the sole exception of the tanker trades. Untold harm is being inflicted upon American business, incalculable costs are piling up each and every day, markets are being lost, and ships that ply the seven seas are shunning our shores. Merchandise, sold by firms abroad in all good faith to American importers, is rotting in ships lying in our harbors, or upon our docks, and in other instances is returned in the same vessels to place of origin or diverted to other foreign markets.

"It is often said that 'It is an ill-wind that blows no one some good,' and during the present paralysis of United States Pacific Coast shipping, British Columbia has been the gateway for oversea trade. Congested conditions are reported at the port of Vancouver, which

is enjoying uninterrupted and tremendously increased business. There have been no charters effected on the Pacific Coast for loading at United States ports; hence there is no market upon which to report this month."

In this connection, a recently received Department of Commerce release is of great interest as showing how changes in trade routing are not so simple as their surface appearances would indicate. Here is the release:

"In view of the shipping emergency, shippers of American goods to the Philippines via Vancouver are informed that the Collector of Customs at Manila is unable to waive customs provisions, which require direct shipment on a through bill of lading and shipment through Canada in bond. All shipments not conforming are subject to the regular Philippine duty."

International Trade Notes

The British Columbia salmon pack for the current season shows an appreciable increase over 1935. As of October 31, 1936, the pack amounted to 1,804,181 cases, compared with 1,484,862 cases for the corresponding period of last year. This year's pack of sockeye totaled 409,321 cases against 346,074 cases in 1935; chums, 538,203 cases, against 384,907; pinks, 584,705, against 506,274, and cohoe, 208,518, against 210,908.

Colombian Motor Vehicle Market. Colombia's favorable economic position is indicated in the continued improvement in automotive imports into that country. Arrivals of all types of motor vehicles in the first nine months of this year amounted to 3,137 units, which is only 8 units under the total for the complete year 1935. American passenger cars and trucks as usual dominated the market, accounting for 1,731 units and 1,336 units, respectively, in the January-September period of 1936.

This is a seagoing church used in the delta of the Parana River, Argentina. It is of steel, assembled by welding with an American welder supplied by the Lincoln Electric Co. of Cleveland, Ohio.

New Zealand Rabbits. New Zealand's export trade in rabbit skins, it is pointed out, has sharply expanded in the last four years. Shipments abroad in 1935 totaled 13,536,745 skins, compared with 13,035,015 skins in 1934 and 6,660,140 skins in 1932. Approximately 60 per cent of the direct exports are consigned to the United States, and it is estimated that the bulk of the shipments to the United Kingdom eventually are purchased by American hatters and furriers.

In 1932, the average price per skin was approximately 3 cents, while in 1935 it had risen to 11½ cents. During the current year, due to the unprecedented demand, the price has advanced to 18 cents per skin. In the past seven years exports of New Zealand rabbit skins have amounted to 66,114,000 pieces, valued at $6,447,437.

British Malayan Trade. Exports from British Malaya to the United States advanced from a total value of $59,912,000 in 1933 to $124,000,000 in 1935 and this year it is probable that they will amount to approximately $130,000,000. On the other hand, exports from the United States to British Malaya increased from $2,397,000 in 1933 to $5,250,000 in 1935, and indications are that the 1936 total will approximate $6,000,000, it was stated.

The outlook for Malaya in 1937 is exceptionally bright. Rubber prices have been rising steadily throughout the last half of 1936, and with the assurance of increased production in 1937 more revenue is certain. With International Tin Control Renewal a further period of prosperity for the local tin industry is at hand. All signs at the present time indicate an increase in the Malaya's export trade to the United States, and increased imports of American products into that market.

Batavia and Manila Air Service. The successful flight recently made by an American newspaper correspondent between Batavia, Java, and Manila may be the forerunner of a regular air service between those two points.

The plane used was chartered from the Netherlands Indies Airways (KNILM). It followed the regular route of the KNILM as far as Balikpapan, Borneo, where the present regular passenger line ends. The 660 miles between Balikpapan, Borneo, and Zamboanga, Philippine Islands, was made in 3 hours and 25 minutes, from which place the plane proceeded to Manila. Total elapsed time from Batavia to Manila, including a 14-hour overnight stop, totaled a little over 29 hours.

As this flight was made without special attempt at speed, and included all the stops that would probably be included on a regular service to Manila, the ease with which the plane reached that city in less than 30 hours surprised even officials of the KNILM, who had expected the flight to take over 50 hours.

New Super Air Liners

$3,000,000 Fleet of 28 Great Land Planes to Serve United Air Lines and Make Connections with Water Transport

Another link in the water-air chain connecting widely separated ports of the world by a system of rapid and luxurious transportation will have been forged in the near future when United Air Lines launches the last of its new $3,000,000 fleet of 210-miles-an-hour 12-ton twin-engined Douglas air liners.

Blazing new trails in air service, United will have in operation in the near future 28 new sky Pullmans enabling air travelers to cross the continent in a few hours, surrounded by the essential comforts of an ocean liner. This fleet of modern air liners will consist of ten 21-passenger planes, ten 14-passenger super de luxe transports, and eight sleepers. United officials announced that the 21-passenger planes are destined for use on the Pacific Coast run between San Francisco and Los Angeles, while the de luxe transports and the sleepers will be placed in service on the Mid-continent route between the Pacific Coast and New York. The fleet of 10-passenger Boeings previously used by the air line will be employed on short hauls to supplement the service offered by the mammoth Douglases.

First of the 21-passenger planes was placed in service in the middle of December, and has already justified the vision of United officials in ordering the $3,000,000 outlay for expansion of its service, according to S. A. Stimpson, Pacific Coast traffic manager for the line. Stimpson declared that travel over United Air Lines has increased 20 per cent during the past year and that a large percentage of the passengers on the coast-to-coast run are world travelers hastening across the continent to make sailing connections. During the same 12-months' period air express shipments increased 33 per cent and air mail approximately 24 per cent.

These planes, with a wing spread of 95 feet, are the nation's most powerful land planes, having two 14-cylinder twin-row Wasp engines, each capable of developing 1150 horsepower. The giant air liners have a wing area of 987 square feet, are 64 feet long, 16 feet high, and carry two pilots, 21 passengers, a stewardess, and cargo. The planes have a top speed of 210 miles per hour, a cruising speed of three miles a minute, and a cruising range of 1500 miles. Because of their vast cruising range, the new ships will enable United substantially to reduce coast-to-coast flying time.

New features in design construction, as well as luxury and comfort, are incorporated in the planes, which have the quiet luxury of a club car. The air in the cabin is changed every minute, fresh air being preheated by a steam system which permits the temperature in the cabin to be maintained at 70 degrees when the outside thermometer registers 30 degrees below zero.

Queen of the airways—A 21-passenger, 12-ton, twin-row Wasp engine, Douglas sky liner.

The powerful 14-cylinder Wasp engines take the 24,000-pound transport off the ground after a run of only 980 feet. With full load, the plane will climb to 23,000 feet, while level flight can be maintained at 9,500 feet with only one engine in operation. The cabin salon is approximately eight feet wide, 27 feet long, and 6½ feet high, and is equipped with every convenience for the comfort of the travelers, including galley, stewardess compartment, and lavatory.

In addition to the two human pilots these planes are equipped with a robot pilot, which can fly the ship without human hands touching the controls. The planes are also equipped with de-icers on the wings and propellers, thus eliminating one of nature's handicaps while flying in cold weather.

Port of Portland Notes

Hector M. Hunt, president of the Coastwise Line, new steamship service, Portland, Seattle, San Francisco.

● **The Coastwise Line.**

Announcement of the proposal to establish a steamship service between Portland, Seattle, San Francisco, and Los Angeles, known as the Coastwise Line, with headquarters in Portland, and with Hector M. Hunt, Portland, as president, put to rest numerous rumors afloat in steamship circles during the latter portion of 1936.

Mr. Hunt said the company would have six standard type steel steamers in the service at the beginning, three operating between Portland, San Francisco, and Los Angeles, and three between Seattle and the California ports, with sailings southbound from the northern ports and northbound from San Francisco each Saturday.

While the headquarters office will be maintained in Portland, the company will have its own office in Seattle and will be represented in San Francisco and Los Angeles by the Panama Pacific Line, intercoastal service of the International Mercantile Marine Company. In fact, the Coastwise Line will serve as the coastwise feeder of the Panama Pacific Line, transshipping freight at San Francisco.

The Portland terminal will be the former Admiral Line terminal, which is owned by the Spokane, Portland and Seattle Railroad, and is being reconditioned for its new employment. Two high-speed marine elevators are being installed to handle freight from river boats and barges.

The Coastwise Line proposes to transport much of the Crown-Willamette Paper Company's products from the northern ports to California and to handle general freight northbound.

Mr. Hunt did not immediately announce his associates in the new service, but stated that they were important cargo-producing firms in Seattle, Portland, and San Francisco. He did not identify the vessels to be employed, although the maritime industry believed they would be either Admiral or Nelson Line steamers forced into idleness when those two veteran services withdrew from the coastwise trade.

Mr. Hunt, who will be president of the company, became interested in the steamship business before the world war, when, as a student at University of Washington, he joined Frank Waterhouse & Company at Seattle for part time employment. He joined Yamashita Shipping Company after the war, was transferred to Portland in 1923, and later became district manager in Portland.

In 1926 he joined Columbia Pacific Shipping Company as general agent in Japan and North China, and in 1928 was transferred to Manila as general agent. He returned to Portland in 1931 to become manager of the Oriental services of States Steamship Company, which succeeded Columbia Pacific Shipping Company, and remained in that position until last May, when he resigned to organize his own company. The Coastwise Line is the first product of his private efforts.

During his thirteen years of participation in Portland's maritime affairs he has been exceptionally popular, and his new venture has the good wishes of hundreds of friends up and down the Coast.

● **Strike Stagnates Shipping and Cripples Industry.**

As the holiday season neared, Portland's waterfront remained quiet, with 22 American vessels idle in Columbia River ports and a handful of foreign bottoms coming and going in search of cargo. One vessel, the Norwegian motorship Primero, brought a cargo of Argentine corn, which was needed by farmers and poultry raisers in Oregon and which the joint union strike committee agreed to discharge in view of the shortage.

Other vessels did not fare as well. Several Japanese steamers, the Greek steamer Nemea, and the Danish motorship Nordpol arrived for wheat and lumber cargoes and finally drifted away to British Columbia when their owners decided not to attempt to wait out the strike.

The Greek steamer Mount Atlas and Panaman motorship Noumea, ex-Danish Jutlandia, were both casualties in early December. The former was forced into Astoria for replacement of her shifted lumber deckload after encountering heavy seas, and the latter suffered engine trouble and had to be towed into the Columbia River by the coast guard cutter Onondaga. Unable to get striking unions to permit drydock employees to accept employment, Portland ship repair yards were forced to pass up a $50,000 repair job on the Noumea, and she was subsequently towed to Victoria, B.C., for repairs.

Steamship operators announced that after the strike was ended, nearly one week would be required to get their vessels in shape for service. While not many vessels idle in the Columbia River's fresh water would require drydocking, States Line, in particular, pro-

posed to drydock its steamers laid up in salt water ports.

● Portland Propeller Club.

Portland chapter, Propeller Club of the United States, became a full-fledged member of the national organization December 4, when Captain F. E. Lovejoy, Seattle northwest vice-President, presented the club's charter at a dinner meeting. K. C. Conyers, president of the Portland club, accepted it.

Frank Branch Riley, silver-tongued attorney, was toastmaster, and introduced the speaker of the evening, Mayor Joseph K. Carson, who expressed some of his personal sentiments regarding the maritime strike. He told how a number of West Coast mayors, attending the national conference of mayors at Washington, D.C., two weeks before, had placed themselves on record applying the arbitration principles of the American railroad labor act to the maritime industry.

A number of University of Oregon students were present and expressed their intention of forming a chapter of the club at Eugene.

● North Jetty Repairs.

The north jetty at the Columbia River entrance is the next big repair project to be tackled by the United States Engineer Corps in the Portland area, Colonel Thomas M. Robins, division engineer, revealed in his address at the dedication of the Port of Vancouver, Washington, terminal No. 2, December 3.

Colonel Robins said the army engineers had recommended that $700,000 be budgeted for repair of that jetty during the 1937 fiscal year, beginning July 1, 1937. The jetty is much smaller than the south jetty, which was reconditioned during the last three and a half years at a cost of nearly $4,000,000.

● Shipping Club.

Portland Shipping Club indefinitely postponed its annual Christmas cruise, originally dated for December 19, in view of the maritime strike, which had seriously affected the financial condition of many of the shippers and operators who usually attend these parties. The arrangements committee had planned a dinner and vaudeville show that would cost about $1500 to produce.

Seattle Shipping Briefs

● New Oil Barge and Tug

H. C. Hanson, Seattle naval architect, recently completed one of his most important contracts, the construction of a 60-foot diesel-powered tug and a 90-foot steel gasoline barge for Kirk Thompson, Spokane oil distributor for the General Petroleum Corporation. The vessels will be used for the transportation of gasoline up the Columbia River to Attalia, one mile beyond Wallula, from Portland. Tanks have already been erected at Attalia to store the cargoes from this barge. The tug and the barge were delivered to their owner in Portland December 16. They were designed by Hanson and built by him at the plant of Maritime Shipyards, Inc., in Seattle.

The tug is 60 feet long, 17 feet beam, and of shallow draft, drawing only 3½ feet of water. She is heavily constructed of yellow cedar and iron bark. The vessel has a V-bottom, with twin semi-tunnels of a type especially designed by Hanson.

The tug was christened Mary Gail for Thompson's three-year-old daughter, Mary Gail Thompson. The craft is equipped with two 200-horsepower eight-cylinder Winton diesel motors. The engines drive two 3½-foot diameter propellers through a 3 to 1 reduction gear and give the Gail a speed of 14 miles an hour, navigating free and from seven to ten miles an hour when pulling or pushing the loaded barge.

Capable of carrying 100,000 gallons of gasoline, the barge, 90 feet long, is 30 feet beam and about six feet in depth. It is of steel welded construction and will draw about seven inches when light and about four feet when loaded. Fourteen expansion domes are provided to take care of increase in volume of liquid cargo during hot weather.

● Fishboat Fleet Outfitting

Three hundred fishermen, who man Seattle's trolling fleet, early in February will begin outfitting 150 craft for the 1937 season on banks off Cape Flattery, the west coast of Vancouver Island, and the Washington coast.

More than 4,000,000 pounds of salmon were caught by the fleet during last season. The catches were brought to Seattle direct by vessels of the trolling fleet, or landed at Neah Bay near the entrance of the Strait of Juan de Fuca and delivered to Seattle by carrier vessels.

● Markey Acquires Cunningham

The Markey Machinery Company and the Doran Company, both of Seattle, have purchased the plants, business and patents of the Allan Cunningham Company of Seattle, internationally known manufacturer of marine equipment. The late Allan Cunningham built up a fine reputation for the efficiency and reliability of the steam and electric driven deck auxiliaries bearing his name.

The Markey Company will take over the marine auxiliary equipment of the Allan Cunningham Company and will build an addition to its plant for the manufacture of this well-known line. The Doran Company will take over the manufacture of the famous Cunningham whistles.

● Maritime Commission Dockings

Four Maritime Commission freighters, which have been idle in Lake Union, Seattle, nearly five years will be drydocked for survey to determine their fitness for

New tug Mary Gail, built of yellow cedar and iron bark and powered by Winton diesels, tows all welded steel oil barge.

service as units of the American merchant marine or naval auxiliaries, according to word received in Seattle. The vessels are the steel steamships Pacific Hemlock, Pacific Pine, Pacific Spruce, and Pacific Redwood, which have been moored in the lake since early in 1932.

● **Port Personals**

K. D. McKenzie, district passenger agent in Seattle, and A. S. Stewart, assistant general passenger agent in San Francisco, for the Alaska Steamship Company, will leave soon after the first of the year for a tour of the Middle West and East, where they will make a survey of prospects for Alaska excursion travel in 1937. Reservations for Alaska cruises are being made, although no sailing dates have been set due to the maritime strike.

The trading schooners Discoverer and Kasilof, owned by **Captain Heinie Berger,** veteran Alaskan, have arrived in Seattle from the North and are tied up for the winter. The vessels operated from Seward to Anchorage, Cook Inlet.

Lieutenant Commander G. B. Gelly, public relations officer of the Coast Guard, with headquarters in Washington, D. C., was in Seattle recently on a tour of the Pacific Coast.

John L. Moore, purser of the American Mail liner President Grant, has accepted a position with the Tacoma Oriental Steamship Company in Tacoma. He will be employed in the freight and passenger departments. Moore was purser of the President Grant when the vessel carried Vice President John N. Garner and a delegation of United States senators and representatives to Manila to attend the inauguration of Manuel Quezon as first president of the Philippines.

Paul H. McClelland, general passenger agent of the Nippon Yusen Kaisha, with headquarters in Seattle, and Mrs. McClelland, sailed Christmas Day on the liner Heian Maru for the Orient. Mr. and Mrs. McClelland will visit Yokohama, Tokyo, Kobe, and other cities in Japan, and then go to China. It will be their first trip to the Orient.

Commander L. V. Kielhorn, who came to the Pacific Coast in 1934 from the Philadelphia Navy Yard, said good-bye to Seattle December 19 when his ship, the Coast Guard cutter Chelan, sailed for her new station at Boston. Commander Kielhorn formerly was chief of staff of the Seattle Division of the Coast Guard, relieving Commander Fred A. Zeusler when the latter was transferred to Coast Guard headquarters in Washington, D. C. The Chelan steamed for the East Coast just eight years to the day from the time she arrived in Seattle from the Atlantic.

A. E. Lee, of the steamship department of Mitsubishi Shoji Kaisha, Ltd., was elected president of the Transportation Club of Seattle at the annual meeting. He was unopposed. **Hugh Beckett,** of the Metropolitan Building Company, was elected first vice president; **G. W. Killam,** of the Chicago & Northwestern Line, second vice president, and **Ernest Falk,** Seattle attorney, secretary-treasurer.

New directors are **Otto H. Hagaman,** of the Burlington Route, and **H. N. Peterson,** of the Alaska Steamship Company. The new officers will be installed January 10.

The Puget Sound Navigation Company has taken over the Pacific Coast Company's Pier C at the foot of Jackson Street for all freight moving to or from Bremerton and other Kitsap County points. Freight for the Olympic Peninsula, including Port Townsend, and also for Victoria, B. C., is being handled over the Canadian National Dock. The changes are a result of the rebuilding of the Colman Dock.

Captain William Fisher, Pacific district supervising inspector for the United States Bureau of Marine Inspection and Navigation, recently spent two weeks in Seattle on business in connection with the ships chartered by the Alaska Railroad for relief service between Seattle and the Northland. Captain Fisher's territory comprises the entire United States.

Marine Insurance Review

The New Bullard Universal Hose Mask

For many years the E. D. Bullard Company, of San Francisco, have set a very high standard in the safety equipment bearing their name; and today their engineers and chemists are continually on the watch to catch any weakness in any detail or to improve the reliability and efficiency of any mechanism. This attitude is reflected in the apparatus illustrated herewith, which is a greatly improved air blower and air pressure control mechanism, as applied to the Bullard Universal Hose Mask.

In place of the very efficient light weight manually operated aluminum blower heretofore used, the new apparatus is actuated by a positive displacement rotary blower, surmounted by a discharge T connection for two lines of hose.

On the side of the discharge T is mounted a disc valve which releases the air to the atmosphere when a surplus collects in the hose system. On the top of the T casting is mounted a pressure regulating device which gives several pressures within the allowable range and which also gives a visual and audible indication that the air is going into the hose properly.

The pistons and the cylinders of these rotary blowers are machined in precision tools to a very minute tolerance, so that they form a practically perfect working fit, and their pressure curves at any constant speed and discharge condition would be practically straight horizontal lines.

Eight of these hose mask outfits, as illustrated, have recently been installed on tankers of the Standard Oil Company of California, and are giving very satisfactory service. As shown, the outfit consists of: one manually operated blower mounted on its base; two molded face pieces; two Sam Browne safety belts; two hose reels, each mounted on base, and each equipped with a suitable length of oil proof, non kinking, non blooming hose; and the necessary tools. All of these are stowed in a neat case and are light enough to be easily portable.

In practice, the man with the mask might be working in a gas laden atmosphere in one of the tanks or holds of the ship while the blower, located on deck and operated by another member of the crew, is supplying him with all the fresh sea air he can use.

The E. D. Bullard Company also manufacture canister gas masks that are suitable for use aboard ship. In this connection it is interesting to note that under the regulations now in force "Every vessel provided with sleeping quarters must be provided with either oxygen breathing apparatus with extra cylinders, or gas masks with extra canisters, the number being specified on the certificate of inspection.

"In addition all vessels equipped with refrigeration must carry (at least) one gas mask giving protection against the refrigerant used."

Details of new type manually operated air pump and complete assembly of hose mask.

The Able Seaman

An official manual issued by the Bureau of Marine Inspection and Navigation.

Last month we published an abstract of Parts I and II of the "Manual for Lifeboatmen and Able Seamen," prepared by the Bureau of Marine Inspection and Navigation. This abstract was made from the October issue of the monthly Bulletin issued by the Bureau. The Bulletin for November contains Parts III, IV, and V of the Manual. Part III covers the able seaman and his routine duties, together with such subjects as "Fire Apparatus," "Gas Masks," "The Hand Lead Line," "Reporting Soundings," "Knots and Splices," "Steering Orders," "Suggestions for Seamen," and "Don'ts for Seamen." The treatment is brief but comprehensive, and the language is simple and clear.

Here are a few samples of the "Suggestions" and the "Don'ts," most of which have to do with safe working conditions.

● Suggestions for Seamen

Men engaged in tiering chain in chain lockers should be clear of the locker before the windlass is unlocked.

Men at windlass brakes should always wear goggles when dropping anchor, to avoid eye injury due to flying particles. Goggles should be worn at all other times when any work is being done which might be injurious to the eyes.

Beckets should be used on the eyes of all mooring lines as hand grips when placing the eyes over bitts, bollards, etc. This will prevent fingers from being jammed or crushed.

Davit crank handles should always be fastened with cotter pins or locknuts to prevent them from slipping off during operation.

All wire splices should be parceled and served to prevent hand injury.

Chain stoppers should always be used for wire topping lifts.

Strongback bridles should always have a lanyard of suitable length attached to each end above the hook. This will prevent many injuries to hands.

Strongbacks should be stowed as near the bulwark rail as possible, and on their sides.

Tarpaulins should never be placed over an open hatch, or over one where some of the covers or strongbacks are not in place.

When working a hatch section, all covers and strongbacks should be removed. If this is impossible, those remaining should be carefully secured to prevent unshipping.

Bedding should be well aired whenever possible.

Men working over the side, or in unprotected and hazardous positions aloft, should always use safety belts or bowlines without slack in the safety lines. These lines should be made fast independent of the staging, etc.

Safety belts should be put on before going over the side or aloft and should not be removed until the return on deck.

Stagings should be bolted together, not nailed, and should have supports at least every 8 feet.

When working aloft, all tools should be secured by lanyards to prevent dropping.

● Don'ts for Seamen

Never smoke on deck, on barges, or on the pier when fuel oil is being loaded or discharged.

Never smoke in the vicinity of open hatches or in cargo holds.

While cargo lighters are alongside, do not throw lighted matches, cigarettes, etc., over the side or out of portholes.

Never go up and down ladders with both hands full.

Never work in the hot sun without protecting the head.

Never walk on the side where cargo is being worked.

Never walk under heel blocks of winches.

Never walk on carelessly piled hatch boards.

Never walk through unlighted 'tween deck spaces.

Never walk on weather side of decks in heavy sea.

Never walk on wet or oily decks with rubber soles or heels.

Never stand in the bight on an anchor cable or line.

Never work aloft without a safety belt and line.

Never use goggles to protect forehead instead of eyes.

Part IV of the Manual states the requirements of

the new law (in effect December 25, 1936, or not later than March 25, 1937) with regard to Certificates of Service and Continuous Discharge Books. **"The purpose of the Continuous Discharge Book is to provide and maintain a continuous record of the employment of the holder on vessels and to make available to him duplicate copies of such record if it is lost."**

Part V is entitled "Rescuscitation of the apparently drowned." It describes in detail the method of inducing artificial respiration in persons "rendered unconscious by gas, electric shock, drowning or any other cause."

This Manual is a very useful and very interesting compilation, and the Bureau is to be commended for its publication in this clear, simple, and inexpensive form.

Eight Hour Day at Sea

On and After Dec. 25, 1936, all American Vessels Must Maintain at Least 3 Watches

"To Collectors of Customs, U. S. Shipping Commissioners, Local, Traveling, and Supervising Inspectors, and All Others Concerned:

"By virtue of the authority conferred by Section 7, Act of June 25, 1936 (Pub., No. 808—74th Congress), the following regulations are established for the purpose of carrying out the provisions of Section 2 of that Act, amending Section 2 of the Seaman's Act of March 4, 1915, providing for the division of watches and hours of labor on shipboard:

"1. The section becomes effective December 25, 1936. On and after that date any failure to comply with its provisions should be reported as a violation thereof.

"2. The section applies to all merchant vessels of the United States of more than 100 tons gross, excepting those navigating rivers, harbors, lakes (other than Great Lakes), bays, sounds, bayous, and canals exclusively. It does not apply to fishing or whaling vessels, yachts, or to vessels engaged in salvage operations.

"3. On vessels to which the section applies the licensed officers, sailors, coal passers, firemen, oilers, and water tenders, shall, while at sea, be divided into at least three watches, the number in each watch to be as nearly equal as the division of the total number in each class will permit. The watches shall be kept on duty successively. The requirement for division into watches applies only to those classes of the crew specifically named in the section.

"4. The term 'sailors', as used in the section, is construed as including only those members of the deck department below the grade of licensed officer whose ordinary duties are incident to the mechanics of conducting the ship on her voyage and required by the vessel's certificate of inspection for the following positions: viz, quartermasters, able seamen, ordinary seamen, watchmen, and lookout men.

"5. No licensed officer or seaman in the deck or engine department shall be required to be on duty more than eight hours in any one day except under the ex-

traordinary conditions mentioned in the section. When the vessel is in a safe harbor no seaman shall be required to do any unnecessary work on Sundays, New Year's Day, the Fourth of July, Labor Day, Thanksgiving Day, or Christmas Day, but this shall not prevent the dispatch of the vessel on regular schedule or when ready to proceed on her voyage. The decision of what constitutes 'unnecessary work' rests with the master of the vessel.

"6. Local inspectors will note that the three-watch system extends to all licensed officers and to the sailors, coal passers, firemen, oilers, and water tenders, and will be governed accordingly in fixing the complement of licensed officers and crew as authorized by Section 4463 R. S., as amended. It does not, however, apply to the licensed officers and crew of tugs and barges when engaged in voyages of less than six hundred miles except with regard to coal passers, firemen, oilers, and water tenders. A voyage of less than six hundred miles is construed as meaning the entire distance traversed in proceeding from the initial port of departure to the final port of destination, stops at intermediate ports while en route not being considered as breaking the continuity of the voyage. Where changes in outstanding certificates of inspection are necessary they may be made by indorsement.

"7. In addition to collectors of customs, who are specifically designated by the Act as enforcement officers, all field officers of the Bureau of Marine Inspection and Navigation of this Department are designated as enforcement officers for the purpose of seeing that the provisions of this section are complied with.

"8. Collectors of customs and shipping commissioners are directed to distribute copies of this circular to masters of vessels and shipping interests concerned.

"Approved December 4, 1936."

DANIEL C. ROPER
Secretary of Commerce.

Exhibit of Marine Fire Prevention Devices

Visitors at the exhibit of Walter Kidde & Company, Inc., at the 1936 Marine Exhibition at New York, were much interested in the new Richaudio system, justly declared by its manufacturers to be the latest in smoke detectors. This system embodies all of the good features of the Rich system, such as illumination of the first smoke particles for visible detection and auxiliary smell detection. In addition to these factors, a photoelectric inspection tube analyzes the first smoke particles without dilution and with resulting audible alarm.

Besides a complete line of "Selex" and "Zonit" automatic alarm system for cabins and crew quarters, and Lux portables and Lux O-Matic systems for fire extinguishment, other new features at the booth of this firm were the Kidde pure water and anti-freeze extinguishers.

These two units have recently been approved by the U. S. Bureau of Marine Inspection and Navigation for use wherever a $2\frac{1}{2}$-gallon extinguisher is required. Two important features of these extinguishers are: (1) the elimination of all acid damage; (2) the fact that they do not require annual discharge and recharge. Furthermore, the anti-freeze unit allows for location of extinguisher in cold places without any impairment in efficiency when required for use.

A. M. Doxsey and H. H. Dierksen, of Walter Kidde & Company, Inc., were in charge of the firm's exhibit.

New Shape Cutting Machine

Introduction of the new Oxweld Type CM-12 Shape Cutting Machine by The Linde Air Products Company makes available to the metal working industries a machine designed to give the accuracy and range of work demanded more and more of the flame cutting processes. Its precision, simplicity, and economy of operation will widen the scope of shape cutting.

In addition to cutting shapes of all description, the machine will cut straight lines automatically in any direction and at any bevel. Cuts as long as 144 inches are possible, and an important feature lies in the fact that straight line cuts can be made at any desired angle in the horizontal plane. A special circle cutting attachment is also provided, thus enabling the automatic production of circles from 2 to 24 inches in radius. Still another feature is that of multiple cutting. The apparatus is designed to carry from 2 to 5 blowpipes, which can perform multiple cutting operations under all the conditions possible with a single blowpipe.

The features of design and construction which make possible the accomplishments of this new shape cutting machine typify the trend in modern machine development.

Alloys have been utilized to establish an ideal strength-weight ratio, combined with the necessary stability and rigidity of construction.

Complete enclosure of the vital working parts insures correct lubrication and freedom from maintenance.

The motor, rated at 1/3 horsepower, and more powerful than that on any other shape cutting machine in this class, produces a driving force reliable under all conditions. The speed range of the CM-12 is from $1\frac{1}{2}$ to 75 inches per minute.

All important controls have been duplicated, so that operation is possible from either blowpipe or tracing position.

The blowpipes used have been constructed to give greater flame stability and increased economies in cutting. Material up to 12 inches in thickness can be easily handled; for heavier cuts, a special blowpipe is available.

The sensitive tracing mechanism, accurate scale calibrations, and freedom from friction and vibration, incorporated as a result of careful study and workmanship, make precision cuts a routine accomplishment.

A distinct contribution to the metal working industries, the Oxweld type CM-12 Shape Cutting Machine is certain to introduce economies and advancement in the cutting and shaping of metals.

On the Ways —

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

One Hundred and Ninety-Seven Drydockings

Perhaps the largest drydocking order in the history of American docks is that now pending in the near future plans of the United States Maritime Commission. Negotiations to drydock the vessels in Navy yards are now under way between the Commission and the Navy Department. Where this cannot be arranged the ships will be drydocked in private yards.

There are 197 vessels in the Maritime Commission's Reserve Fleet. With the exception of four ex-German passenger vessels, which are tied up at Solomons Island, Maryland, in the Patuxent River, these ships were constructed by the Government during and immediately following the World War. The ex-German ships will not be drydocked. The remaining 193 have been classified according to their condition as follows:

Class I consists of 40 of the best ships which are suitable for operation by the Government, charter or sale to American citizens, or use as Naval auxiliaries.

Class II consists of 131 ships which have a negligible value for commercial use but could be utilized in case of a national emergency.

Class III consists of ships which have no value except for sale as scrap. There are now 26 boats in this category.

Vessels in Class I of the Reserve Fleet have been maintained in a first class state of preservation. Vessels in Class II are being preserved as regards hulls, boilers, and machinery. No maintenance work is being done on the vessels in Class III. This classification was made after a survey in 1934-35 by a joint committee representing the Merchant Fleet Corporation, the Navy Department, and the American Bureau of Shipping. A similar committee will inspect the vessels when they are drydocked.

At that time none of the vessels was drydocked, and in the case of the majority of the ships, it has been ten years since an inspection of their hulls was made. Consequently, it is believed that there may be some vessels in both Class I and Class II which should be transferred to Class III because of the condition of their bottoms.

After the drydocking has been completed, the Maritime Commission will decide what disposition is to be made of the ships in Class III.

The different points at which the vessels of all classes of the Reserve Fleet are located, and their number, follows:

Staten Island, New York	54
Fort Eustis, Va. (James River)	71
Solomons, Md. (Patuxent River)	4
New Orleans, La. (Nine Mile Point)	61
Mobile, Ala. (Twelve Mile Island)	3
Seattle, Wash. (Lake Union)	4

Atlantic Basin Award

The largest ship alteration contract awarded in years in the Port of New York, amounting to approximately $500,000, has been awarded to the Atlantic Basin Iron Works, Inc., Brooklyn, New York. Work is to be performed on the U.S. Army Transport Republic.

Bernard A. Moran, president of the company, said that this contract involves furnishing and installing new boilers (Foster Wheeler type), superheaters, fuel oil burning apparatus, renewing tank tops, overhauling and repairing the main engines, installing mechanical means for lowering lifeboats, and other installations in accordance with the requirements of the Bureau of Marine Inspection and Navigation. Installation of loud speaker communication and alarm system included.

Tug Repowered

The Western Engine Corporation, of Los Angeles, reports the sale of a factory rebuilt 110 h.p. Western Diesel engine to the Astoria Tug & Barge Company, of Astoria, Oregon. The engine is one of the highly successful, heavy duty type A Western Diesels, with a bore of 9 inches and stroke of 12½ inches, developing its rated power at 330 r.p.m. It is of the non reversible type and is fitted with a reverse gear. This engine was recently removed from the fishing boat Humanity at San Pedro, in which was installed a new 110 h.p. Western Diesel.

The Western engine bought by Astoria Tug & Barge will replace a 75 h.p. diesel and give the tug sufficiently greater power to handle the increasing amount of towing work.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: Hull 5355—McCall (DD400). Completion date 9/19/37. Hull 5356—Maury (DD401); completion date 12/19/37; two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $2,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; completion date, April 2, 1937.

THE CAMPBELL MACHINE COMPANY
Foot of Eighth Street
San Diego, California

NEW CONSTRUCTION: Hull 49, Belle of Portugal, tuna clipper; Lawrence Oliver & Co., owners. Length 130'; main engine 550 h.p. 6 cylinder Union diesel engine. Launched September 19, 1936; completion date, January 1, 1937.

Hull 50, Picaroto, tuna clipper; Lawrence Oliver, Rosa Bros. & Co., owners; sister ship of Belle of Portugal, Launched October 15, 1936; completion date, January 1, 1937.

Hull 53, Victoria, tuna clipper; Mathew C. Monise, owner. Length 135', main engine 600 h.p. 6 cylinder Union diesel. Launching date, November 1, 1936; completion date, March 1, 1937.

Hull 54, Triunfo, tuna clipper; Joaquim Canas & Co., owners. Length 125', main engine 450 h.p. 6 cylinder Union diesel. Launching date, November 10, 1936; completion date, March 1, 1937.

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION: 4 keels laid July 6, 1936, Fellows Craft stock cruisers 30' x 8' x 2'6", powered with Kermath Sea Flyer 6-cylinder 85-H.P. engines with 2 to 1 reduction gears.

One 45 ft. ferry service boat powered with twin 110 H.P. Buda diesels.

Five 32 ft. W.L., 46 ft. O.L. One design sloop yachts, keels to be laid in the immediate future.

Auxiliary power, with small h. p.

DRYDOCK AND ROUTINE REPAIRS: Dwyn Wen, Corsair, Sea Wolf, Hi Ho, Los Cerritos. Five small boats also in yard.

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Gas. S. Linde, Dredge Dan C. Kingman, Tahoe, Barge No. 103, Gas. S. McKinley, Gas. S. Transit, Gas. S. Excell II, Gas. S. Infallible, Gas. S. New Saturnia.

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: Four 80' U. S. Coast Guard patrol boats; 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laids September, 1936; estimated launching, March, 1937; expected completion, July, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: Yacht Araner, President Hayes.

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: Boxer, Ferry Mercer, Yacht Nisbit, Steam Ferry Washington.

THE LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif

DRYDOCK, PAINT, MISCELLANEOUS: Golden Sun, Golden Dragon, Tug Capt. William, Tug Listo, M.V. Capella, Mojave, Rossington Court, Tug D. M. Benton, G/B Princess, Golden Horn, Brandywine, Catalina, Deroche, W. R. Chamberlin, Jr.

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Water Barge YW30, Elizabeth, Seattle, Esther Johnson, Brunswick, Dorothy Wintermote, Polarine, Patterson, American Star, Roseville, Frances, Foy Dredge No. 1, Pegasus, West. Pac. Barge No. 1, West. Pac. Barge No. 2, Richlube, Lebec, Vagabond, Jackie Sue, Currier.

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: M V. Bellingham, 9 fishing boats, 15 ship repair jobs not requiring docking, 24 commercial jobs.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: U.S.S. Patterson (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 23, 1935; estimated completion date, February 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935, estimated completion date, May 1, 1937.

Construction of Destroyer No. 408, U.S.S. Wilson, 1500 tons, keel not yet laid.

DRYDOCK AND ROUTINE REPAIRS: Colorado, Texas, Idaho, Mississippi, Salt Lake City, Challenge.

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION: Folderol, 48' cruiser, teakwood hull, equipped with Scripps 164-165 motors, for Marshall Dill, San Francisco; launched October 4, 1936.

Keel laying begun for ten 36' and ten 29' stock keels.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island, Seattle, Wash.

DRYDOCK, PAINT, MISCELLANEOUS: Tug Active, Tug Irene, M.S. Kalakala, Ferry Rosario, M.S. Chippewa.

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: Henley, Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); estimated delivery August, 1937; keel laid January 14, 1936; to be launched early in 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; launching date not set; completion date June 1, 1938.

DRYDOCK AND ROUTINE REPAIRS: **Farragut, Dewey, Hull, Worden, Litchfield, Chandler, Bainbridge, Goff, Reuben James, Bridge, Sturtevant, San Francisco, Tuscaloosa, Memphis, Relief, Langley, Kalmia, Bass, Cuttlefish.**

WESTERN BOAT BUILDING CO.
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 120, purse seine fishing boat; 87 feet long, 23 feet beam; 170 H. P. Atlas Imperial engine. Keel laid September 15, 1936; launching date, December 10, 1936; estimated completion date, February 1, 1937. Owner, Paul Sleipnes and associates, San Francisco.

Hull No. 121, purse seine fishing boat; length 75 feet, beam 19 feet; 135 H. P. Atlas engine Keel laid November 15, 1936; **launching date, January 15, 1937**; to be completed by February 25, 1937 Owner, Paul and Vincent Martinis, Everett, Wash.

DRYDOCK AND ROUTINE REPAIRS: **Fishing boats Banner, Planet, Oregon City, tug Fearless, pile driver Chinook.**

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION: **4 dump scows** 114'x26'x7'9"; **20 coal barges** 175'x26'x11'.

DRYDOCK AND ROUTINE REPAIRS: **10 coal barges** 175'x26'x11'; **4 dump scows.**

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Hull No. 915, Four yard dipper dredge**; length overall 110'; breadth molded, 40'; depth molded, 8'; steel house 84'x24'x 10'3" high; no living quarters. Designed for maximum bridge clearance of 15', which requires a frame and stack to be collapsible. Scotch boiler 13' diameter by 12'10" long; 160 lbs. pressure. To be built at Buffalo. Keel laid December 20, 1936; delivery date, April 15, 1937.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis and DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively. **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hull No. 167, Ferryboat **Aquidneck**. Diesel electric ferry for U.S. Navy; estimated delivery, March, 1937.

Hull No. 169, Trawler, single screw, diesel propelled, for delivery to Boston, Mass., owners in April, 1937.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 172, "J" class sloop for Mr. Harold S. Vanderbilt; delivery spring, 1937.

Hull No. 173, Winchester, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, May 15, 1937.

Hull No. 174, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, June 1, 1937.

Hull No. 175, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 176, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION: **Heavy Cruiser CA44, Vincennes**, 10,000 tons. Keel laid January 2, 1934; launched May 21, 1936; estimated delivery, January 1937.

DD-380, Gridley, 1500 Ton Destroyer. Keel laid June 3, 1935; launched December 1, 1936; estimated delivery, March, 1937.

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; estimated launching, March, 1937; estimated delivery, June, 1937.

CV7, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; estimated delivery February 1, 1938.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil Tankers**—steam—425'x64'x34' for Gulf Refining Co.; total tonnage 7070 each.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel** towboats of 450 horsepower each.

One 90' all-welded diesel towboat of 750 horsepower.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: One 65' all welded steel diesel tug for the Krajewski-Pesant Mfg. Co., New York.

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

NEW CONSTRUCTION: **65-footer** for E. E. Dickinson, powered with 2 Speedways, **42-footer** for A. P. Green, powered with 2 110-H.P. Kermaths.

Four 39-foot "play boats" for stock.

34-foot Florida guide-boat, powered with 2 Grays.

42-foot Florida guide-boat, powered with 2 Grays.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION: **One 175'x34' x10'** tender for U.S. Lighthouse Dept. Two triple expansion steam engines; total horsepower 1000; keel laid July 1, 1936; estimated delivery, February 1, 1937.

One fire boat for City of Chicago, 90' 6" long, 22'4" beam; diesel power; pumping capacity, 7,500 gallons per minute at 150 pounds; **delivery January 1, 1937.**

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997**, one diesel sternwheel towboat of 91 gross tons.

Hull No. 1297, one welded oil barge 110' x 20' x 11' for Patterson Oil Terminals, Inc., Philadelphia, Pa.; 335 gross tons.

Hulls Nos. 1298-1299, inclusive; two self-propelled diesel pipe line dredges, Thompson and Rock Island, for U.S. Engineers, St. Paul; 3974 gross tons.

Hull 1310, one welded steel coal barge, 134' x 34' x 16', of 362 gross tons.

Hulls 1311-1313, inclusive; three riveted sand and gravel barges 100' x 26' x 6'6", for Smoot Sand and Gravel Corp., Washington, D. C.,; 495 gross tons.

Hulls Nos. 1318-1323, inclusive; six welded type W-3 coal barges 175' x 26' x 10'8" for stock, 4720 gross tons.

Hulls Nos. 1324-1327, inclusive; four welded flush deck cargo box barges 100' x 26' x 6'6"; 660 gross tons.

Hulls Nos. 1328-1337, inclusive; ten welded type W-3 coal barges 175' x 26' x 10'8" for stock; 4720 gross tons.

Hulls Nos. 1338-1341, inclusive; four welded hopper type steel coal barges 100'x26'x10'8", for O. F. Shearer Sons; 1080 gross tons.

Hulls Nos. 1342-1351, inclusive; ten welded type W-3 coal barges 175'x26"x 10'8", for stock; 4720 gross tons.

This makes a total of 42 hulls under contract, with a total gross tonnage of 19,269.

ELECTRIC BOAT CO.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 24, Pickerel, S.S. 177 keel laid March 25, 1935; launched July 7, 1936; estimated completion date, January, 1938.

Hull No. 25, Permit, S.S. 178, keel laid June 6, 1936; launched October 5, 1936; delivery date, March, 1938.

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY

Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, **DD381 Somers** and **DD383 Warrington**; keels laid June 27, 1935 and October 10, 1935, respectively; estimated launching, December, 1936 and January, 1937, respectively; estimated completion March 1, 1937.

Three destroyers, DD 397, DD 398 and DD 399; estimated completion January, April and July 1938; keel laid, DD397, September 1, 1936.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing.

THE INGALLS IRON WORKS COMPANY

Birmingham, Ala.

NEW CONSTRUCTION: **Two barges,** 132'x30'x7'9", for carrying petroleum products in six tanks in hull or for heavy deck loading; to be built at Chikasaw (Mobile), Alabama, yard. Estimated launching date, February, 1937.

Six 1000-ton all welded steel deck barges for sand and gravel movements; length 130', breadth 34', depth 10'. To be built at Chickasaw (Mobile), Alabama, for Warner Company, Philadelphia. Delivery of three March 15, 1937; second three, April 15, 1937.

JAKOBSON & PETERSON, INC.

Ft. of 16th Avenue

Brooklyn, New York

NEW CONSTRUCTION: **One 65' all welded steel combination tow boat and tanker** for the Lewis Coal & Oil Corp. of Port Washington, N.Y. To be powered with 300-H.P. Atlas Imperial diesel engine. Launching date, November 18, 1936; completion date, February 1, 1937.

Hull No. 263, one oil barge for Lewis Transportation Co.; 110'x24'x10'6"; all welded steel.

DRYDOCK AND ROUTINE REPAIRS: Reconditioning and conversion of full rigged ship **Joseph Conrad** into a yacht. Installation of 160 H.P. Atlas diesel; two 10 K.W. Atlas diesel generating sets, etc.

LEVINGSTON SHIPBUILDING CO.

Orange, Texas

NEW CONSTRUCTION: **One full model hull, all-welded diesel tug,** 55' long, 14' beam, 7'6" deep; 120-horsepower Fairbanks-Morse marine diesel engine; for Atlantic, Gulf & Pacific Co., New York City.

One all-welded, steel derrick barge 50' x 28' x 5'3", for Austin Bridge Co., Dallas, Texas.

One all-welded, steel ferryboat, length overall, 119', beam over guards, 66', beam molded, 54', depth molded, 11'. Twin screw diesel electric. Two 350-horsepower Cooper-Bessemer diesel engines with Westinghouse generators and motors. For Algiers Public Service Corp., New Orleans, Louisiana. Delivery date, February, 1937.

DRYDOCK AND ROUTINE REPAIRS: Reconditioning of lighthouse tender Larkspur for U. S. Lighthouse Department.

MANITOWOC SHIPBUILDING CO.

Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank steamer,** 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated keel laying date, February 15, 1937; estimated launching date, July 15, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY

Point Pleasant, West Virginia

NEW CONSTRUCTION: **Opon, sternwheel river steamer,** 200' x 44' x 5'6"; keel laid November 6, 1936.

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. **Keel laying date, January, 1937.**

MARYLAND DRYDOCK CO.

Baltimore, Maryland

NEW CONSTRUCTION: **Five steel carfloats,** 250'x34'x9', for the Pennsylvania Railroad, to be delivered in Auril, May and June, 1937.

One steel, double ended diesel-electric ferryboat for Norfolk, Va. Probable delivery, February, 1937.

THE NEW YORK SHIPBUILDING CORPORATION

Camden, N. J.

NEW CONSTRUCTION: Contract for two destroyers: **Hull No. 410, McDougal** (**DD358**), launched July 17, 1936; **Hull No. 411, Winslow** (**DD359**), launched September 21, 1936; of 1850 tons each.

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and **Hull No. 416 Phoenix (CL46)** of 10,000 tons each for the U.S. Navy Department; keels laid, 1935;

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.

90 Broad Street, New York

NEW CONSTRUCTION: **H 359 aircraft carrier CV5, Yorktown,** for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; **launched, December 3, 1936.**

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6".

THE PUSEY & JONES CORP.

Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 1060 — one steel hull towboat** building for Donaldson Towing & Lightering Co., Phila., dimensions: 95' L.O.A. 88' L.B.P. x 24' x 14' 9"; one Unaflow vertical marine type engine, two cylinders 25" dia. x 20" stroke, 130 R.P.M. 600 I.H.P. One Scotch type boiler 13' 3" diam. x 11' 6" long, 3 furnaces, 185 lbs. W.P. Estimated delivery, February, 1937.

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O.A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launching date, August 1, 1937; delivery date, September, 1937.

SPEDDEN SHIPBUILDING CO.

Baltimore, Md.

NEW CONSTRUCTION: **One 60-foot iron hull,** all-welded V bottom boarding and fumigating vessel for U. S. Public Health Service; equipped with twin screw Superior diesel engines. Keel laid November, 1936; launching date, February 1, 1937; delivery date, March 23, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Tug Baldrock, Tug Columbia, Tug Hilton, Lighthouse tender Violet, Scow U 27, Scow V 27.**

SUN SHIPBUILDING AND DRYDOCK COMPANY

Chester, Pa.

NEW CONSTRUCTION.

Hull No. 158, one single screw bulk oil tanker for the Socony Vacuum Oil Co. 485'6"x68'0"x37'0"; 15,000 tons deadweight; one 4000 S.H.P. cross

compound double reduction geared turbine unit; three watertube boilers. Keel laying May 8, 1936; launching Dec. 12, 1936; delivery January 15, 1937.

Hull No. 159, 1 oil tanker (diesel), 511'x65'9"x37'; 15,800 tons.

Hull No. 160, 1 oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons.

Hulls No. 161 and 162, steam tankers for Standard Oil Company of New Jersey; 422' x 65' x 35'; 12,900 dwt.

Hulls No. 163 and 164, diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt.; keel laying, December 1, 1936 and December 15, 1936, respectively.

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION: **1 steel gold dredge** (ladder type) hull 155'x70'x13' for South American firm.

24 pontoons 48' x 16' x 2'6" for U. S. Engineer, St. Paul, Minn.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD384, U.S.S. Dunlap, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched April 18, 1936; estimated delivery, April 9, 1937.

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, June 9, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching March 18, April 8, and April 29, 1937, respectively; estimated delivery May 19, June 9, and June 30, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250', Beam 43'6", Depth 16'. Estimated keel laying, April 20, May 11, and June 8, 1937, respectively; estimated launching, August 3, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION: **Destroyer DD370. Case,** L.B.P. 334'; beam 35'; depth 19'8"; keel laid, Sept. 19, 1934; launched Sept. 14, 1935; commissioned September 15, 1936; estimated delivery, February, 1937.

Destroyer DD371, Conyngham, L.B.P. 334'; beam 35'; keel laid Sept. 19, 1934; launched Sept. 14, 1935; commissioned Nov. 4, 1936; estimated delivery, February, 1937.

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, June, 1937 and July, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19'8"; estimated delivery, June and August, 1938.

Order placed for **DD415, O'Brien,** and **DD416, Walker,** two destroyers; no dates set.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn,** light cruiser. L.B. P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu,** light cruiser; L.B. P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935. Estimated launching indefinite; estimated delivery, May 1, 1938.

CL 50, **Helena,** light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December, 1936; launching indefinite; contract delivery, May 16, 1939.

CG 69 and CG 70, **Alexander Hamilton** and **John C. Spencer,** cruising cutters for U.S.C.G. service; L.B.P. 308'; beam 41'; standard displacement 2000; geared turbine drive, express type boilers; keels laid Sept. 11, 1935; floated November 10, 1936; estimated christening date, January 6, 1937; estimated delivery, March 1, 1937, and March 15, 1937, respectively.

DRYDOCK AND ROUTINE REPAIRS: Cummins arrived November 24 for outfitting. Estimated completion date, January 25, 1937. Empire State annual overhaul started November 15. Estimated completion, January 15, 1937.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION: **One Coast Guard Cutter;** LBP 308', LOA 327', breadth, molded, 41', draft 12'6", displacement 2000 tons. Keel laid August 15, 1935; **estimated launching, January 14, 1937;** estimated completion, April 15, 1937.

Order placed for **DD407** and **DD418,** two 1500 ton destroyers; no dates set.

UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION: **CL41, Philadelphia,** L.B.P. 600'0"; beam 61',7¾"; **molded depth at side to main deck amidships 42'0¾"; draft corresponding to normal displacement 21',8½"; standard displacement 10,000 tons; date of completion as reported by building yard, January, 1937.**

(Continued on Page 54)

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

C. L. Cummins

Diesel Executives

The memory of the late Dr. Rudolf Diesel, inventor of the form of power bearing his name, was honored (December 2) by industrial and civic leaders from all parts of the country who gathered to celebrate the 40th anniversary of the introduction of Diesel power in the United States.

Speakers at a luncheon in the Grand Ballroom of the Waldorf-Astoria Hotel, sponsored by the Diesel Committee of the Exposition of Power and Mechanical Engineering, included Gordon Rentschler, President of the National City Bank of New York, Chairman of the Committee; Edward B. Pollister, President of the Busch-Sulzer Brothers Diesel Engine Company, first American manufacturers of Diesel engines; Captain Edward V. Rickenbacker, Vice-President and General Manager of Eastern Air Lines; B. C. Heacock, President of Caterpillar Tractor Company, largest producers of Diesel engines; Edward G. Budd, President, Edward G. Budd Manufacturing Company, manufacturer of the first streamline Diesel-powered train; C. L. Cummins, President, Cummins Engine Company, manufacturer of Diesel-powered trucks and passenger cars; David S. Sarnoff, President of Radio Corporation of America; Colonel Robert H. Morse, President, Fairbanks-Morse & Company, Professor R. U. Blasingame, President, American Society of Agricultural Engineers; Charles F. Kettering, Vice-President, in charge of Research, General Motors Corporation; Thomas H. Beck, President, Crowell Publishing Company.

Mr. Kettering and Mr. Sarnoff, unable to attend the meeting, spoke to the group by radio from Detroit and Chicago respectively. Other members of the Diesel Committee were H. L. Hamilton, President, Electro-Motive Corporation; Arthur Brisbane; Malcolm Muir, President, McGraw-Hill Publishing Company; Walter C. Teagle, President, Standard Oil Company (New Jersey); C. A. Criqui, Sr., President, Sterling Engine Company; B. F. Fairless, President, Carnegie-Illinois Steel Corporation; and Frank A. Vanderlip, Sr.

C. A. Criqui, Sr.

Col. Robert H. Morse and I. W. Drennan examining model of the Vulcania

Edward B. Pollister, R. B. Terhune, Henry Sutphen and George Codrington.

Propeller Club of California Holds Annual Christmas Banquet

An "Off-the-Record" Report of Fun, Frolic and Friendship Meeting

To the Members of the PROPELLER CLUB OF CALIFORNIA

Gentlemen: Your Committee, appointed in accordance with Section 1, Article VIII, of our by-laws, to nominate our President for the year 1937, and four Governors to serve for three years, recommend and nominate the following:

For President: Capt. F. M. Edwards; For Governors (3 year term) Geo. A. Armes, Erik Krag, Walter J. Walsh, Harold Weule.

Respectfully submitted, NOMINATING COMMITTEE.
Jos. J. Coney, Chairman; Dr. A. A. O'Neill, Geo. E. Swett, Capt. A. T. Hunter, Jos. A. Moore, Jr.

Annual election and business meeting will be held Tuesday Noon, January 5, 1937, in the Propeller Club Lunchroom at the Fairmont Hotel ("Red Room"). In accordance with Section III of Article VIII of our by-laws, other nominations may be made by petitions signed by ten regular members and must be submitted 15 days prior to election. In order for a member to vote it is essential that he be in good standing. There are a few members who have inadvertently omitted to pay their dues, i. e., $5.00 for the current fiscal year, Sept. 1, 1936, to Sept. 1, 1937, and it is, therefore, called to their attention at this time as a reminder.

By Order of the Board of Governors,
STANLEY E. ALLEN, Secty.-Treas.

Final Notice: 7th Annual Xmas Jinks, Fairmont Hotel, Terrace Ball Room, 7 P.M., Wednesday, December 16, 1936.

● **Off the Record!**

When the Propeller Club of California stages a party, you have learned to expect the quintessence in good clean fun . . . a swell show . . . an epicurean banquet . . . and a get-together of good fellows; men who enjoy the companionship of each other, come rain or shine.

The "roll-call" for the 1937 Christmas Jinks, although strong in number, was no surprise to past performers. Let it be recorded — it was a great success!

Your reporter foresightedly wore a cuff to the affair. The deciphering of notations:

Ed Harms in rare forensic form paying tribute to President Geary . . . and presenting him with some beautiful silverware.

Our president modestly overcome and practically speechless.

Shipbuilder Joseph Moore, Phil Coxon and guests thoroughly enjoying the fun.

Stanley Allen handling a million details. How does he keep so cool-headed?

Dick Glissman . . . a perfect impresario, with a costume change for each announcement.

George Eggers, S & C's new superintendent remarking: "This show sure beats anything Portland ever staged." (Welcome back to your home port, George.)

A. J. Donnelly joining in the carols, accompanied by Byron Haviside and his younger brother Russell. (Papa Harry allowing that none of the trio had had opera trainin'.)

Vic Burner and Frank Elliott viewing the festival with hearty abandon. (It was Voyage One for both of them.)

Mac Gilmore orating on purse seining methods. Stanley Hiller, Joseph J. Coney, H. A. Nibecker, Chester Ames and Joe Gisler rendered the sextet from the "American Fisher." Hit all scales.

By actual count, Captain "Spit-purple" Blackstone says the story about the 3rd mate on an American tank was related at 10-minute intervals.

"Mac" McConkey looking fit after his big trip to Brooklyn.

George Swett enraptured by the soprano (the one with the elbows!).

It was a well-planned, well-attended Christmas Party . . . this Seventh Annual Propeller Club Banquet.

Yas—suh!

A Prosperous and Bountiful New Year to All Propellers!

● **Luncheon Meetings**

W. Edgar (Eddie) Martin started something a year ago! We refer to the "Propeller Club Handicap" . . . a child of Eddie's brain which, in its second "interpretation," bids fair to become an annual event.

President Joseph Geary announced his complete mystification . . . said the affair suggested a bit of "horse-play" to him. Darned if he wasn't right!

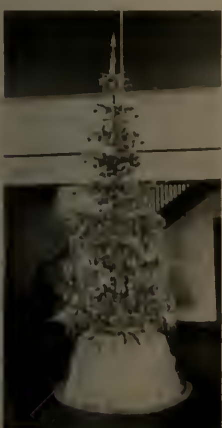
Prizes were abundant. Harry Haviside walked off with the trophy awarded for the most virile chest. Frank De Pue stole first honors for milk-guzzling. Joe Hoxie was "runner-up." Carl Lane had his usual luck in an "objects in the pocket" contest. Charles Robertson proved the best "indoor athlete" . . . Eddie McFarlan the most prolific . . . and so it went!

Dick Glissman was the em-cee, and plenty of club fellowship prevailed. Just a grand program right ahead of the Christmas Banquet!

Charles A. Davidson and Joe Hare are Shell Oil Company's Head Office (San Francisco) marine sales representatives. Both are former Marine Engineers of many years' experience. Here's a "thumbnail" on each of them.

Joe Hare

He was Engineer of vessels of the Alaska S. S. Company, and during the world war was Machinery Inspector for the United States Shipping Board. He later served as Chief Engineer in various Shipping Board vessels out of Pacific Coast ports. Joe went shoreside into Shell service and moved up to his present position of Special Lubrication Sales Representative, covering the shipping industry in all West Coast ports.



Greetings from Hercules to All the Industry

Among the countless Christmas decorative schemes in the Bay area, one of the most outstanding Yuletide trees was displayed by the Hercules Equipment and Rubber Co. in their modern and spacious new headquarters, 550 Third Street in San Francisco. President P. M. Paulsen and his organization were the recipients of scores of messages wishing them success during the coming year, and in turn their hospitality was enjoyed by their legions of friends who saw the beautiful tree displayed herein. Radiating good will to all, the huge Hercules tree typifies the spirit of this wide-awake industrial sales and service organization.

We note with regret the passing of **Cary W. Cook**, one of the real old-timers in Pacific Coast shipping affairs. Mr. Cary had taken part in shipping for about half a century, and was well known all along the Coast. He was associated with Williams, Dimond & Co., then was in charge of the affairs of the old Pacific Mail Steamship Company, and later was president of the American-Hawaiian Steamship Company.

G. Harold Porter Retires

G. Harold Porter, Pacific Coast manager and vice-president of the Radio Corporation of America, after 23 years' service, announced his intention of retiring on December 31. He was born in Carbondale, Pennsylvania, in 1871, and his life has been one of varied vocations; mostly however, in the field of telegraphy and radio.

In 1925 he was sent to San Francisco as manager of the Pacific Coast division of the Radio Corporation of America, after four years as general superintendent of the marine department in New York, for the purpose of developing the affairs of the company. By 1929 he had achieved noteworthy progress, and was promoted vice-president in charge of Pacific Coast activities. In January, 1933, he became a vice-presdent of R.C.A.-Victor Corporation.

Porter states that after retirement he will not be idle—in fact, he has already made plans to become associated with the Preferred Insurance Company, and expects to remain in San Francisco for a long time.

Charles A. Davidson

First sea service saw him in ships of the old Pacific Mail fleet; then in tankers of the Associated Oil Company. He was Lieutenant in the United States Naval Reserve, and during "la guerre" was in the U.S.S. Westerdyke. Later he became Chief Engineer of United States Shipping Board ships out of New Orleans to Mediterranean ports. Charlie joined Shell in 1928, specializing in industrial and marine sales; covers the entire Coast.

G. Harold Porter

Personals

While preparing for a trip to the Orient, **A. F. Haines**, vice president of the American Mail Line, Seattle, was stricken with illness several months ago, but is now reported greatly improved. Although he has served for many years with the Dollar interests, Haines has never been to the Orient.

J. Rypperda Wierdsma, one of the best known men in Holland shipping circles, is reported to have retired as director of the Holland - America Line.

The Pacific Ocean Claim Association recently held its quarterly meeting and luncheon at the Stewart Hotel in San Francisco, practically all members in the district being present. After a short business session, the following offficers were elected for the ensuing year: **E. A. Parker**, general claim agent of the McCormick Steamship Company, was elected chairman, succeeding **W. E. Johnson**, of American-Hawaiian, who has held the position for the last four and one-half years. As its new secretary the association elected **R. C. Wagner**, claim agent of the Weyerhauser Company. Wagner succeeds **W. C. Juergens**, of Swayne & Hoyt, who has held the office for the past ten years.

As an expression of good fellowship, and as a token of its appreciation of the services rendered by Retiring Chairman Johnson, the association presented him with a handsome traveling bag.

Union Oil Company and the Naval Reserve

Some years ago the U. S. Navy Department decided to warrant as naval auxiliaries all vessels in the merchant marine that could meet certain requirements essential to their use as defence units in time of national emergency. Since at that time there were approximately forty merchant marine officers in the Union Oil Company tanker fleet, who had already been commissioned by the United States Naval Reserve, the company's vessels were the first U.S.N.R. auxiliaries to be commisioned and warranted on the Pacific Coast. Every ship in the tanker fleet qualifies so far as physical requirements are concerned, but occasionally the right to fly the Naval Reserve Pennant is temporarily suspended on one vessel or another because of failure to maintain the requisite number of licensed officers with U.S.N.R. commissions. This is mostly due to the necessity of transferring the personnel from ship to ship, and is not, fortunately, on account of any falling off of interest or membership in the Naval Reserve. Before a merchant marine vessel can secure a warrant and have the privilege of flying the coveted pennant, the master and at least fifty per cent of the licensed officers must be members of the U.S.N.R.

W. L. Stewart, Jr., Vice-President in charge of Manufacturing, Union Oil Company, receives commission as Lieut. Commander, Deck Volunteer Service, U.S.N.R., from Capt. Charles S. Kerrick (left).

The Naval Reserve is made up of men who are all specialists in some particular type of service. Those members who are already engaged in the merchant marine are ordinarily designated as deck merchant marine (D.M.) or engine merchant marine (E.M.), depending on the operations with which their daily duties familiarize them. The volunteer specialist service, on the other hand, enlists civilians—men prominent in civics and land industries, whose pursuits or activities qualify them for some specialized phase of naval warfare or defence operations. These men, between definite age limits, are, upon qualification, commissioned as deck volunteer specialists, supply corps specialists, aviation specialists, etc., and are designated the rank to which experience and qualifications entitle them.

The latest member of the Union Oil Company to join the ranks is W. L. Stewart, Jr., vice-president in charge of manufacturing, who was presented with his commission and inducted into office as Lieut. Commander, Deck Volunteer Service, U.S.N.R., by Captain Charles S. Kerrick on Tuesday, Nov. 24. This ceremony took place at the U.S.N.R. Armory, Los Angeles, in the presence of a group of fellow-employee-members and other friends.

Stewart has for many years been intensely interested in marine affairs, and his recent success in the Los Angeles to Honolulu yacht race, in which he was awarded second place, demonstrated his familiarity with navigation and seagoing craft. He was also attached to the U. S. Aviation Service during the war, so that he is well qualified for the assumption of his new responsibilities.

Shipbuilding

(Continued from Page 50)

Coast Guard Cutter No. 68, Roger B. Taney; L.B.P. 308′, beam 41′, depth molded at side to main deck amidships 23′6″, draft corresponding to normal displacement 12′6″, standard displacement 2000; estimated keel laying April, 1935; estimated completion, January, 1937.

CA45 Wichita, L.B.P. 600, beam 61′ 9¾″, depth molded at side to main deck amidships 42′0 3/8″, draft corresponding to normal displacement 21′10″; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404**, 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION: **SS179 Plunger**, keel laid July 17, 1935; L.B.P. 292′6″, beam 25′, loaded draft 15′; launched July 8, 1936; estimated delivery Feb., 1937; **SS180 Pollack**, keel laid October 1, 1935; L.B.P. 292′6″, beam 25′, loaded draft 15′; launched September 15, 1936; estimated delivery May, 1937.

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300′, beam 26′, loaded draft 15′7″; date of completion March 1, 1938; **SS186 Stingray**, submarine; keel laid October 1, 1936; L.B.P. 300′, beam 26′, loaded draft 15′7″; date of completion June 1, 1938.

Harvesting Marine Wealth

(Continued from Page 25)

en by a Westinghouse turbine capable of exhausting against a back pressure. The back pressure steam is sufficient to supply steam for the plant process load and the engine room auxiliaries. In the case of an excess of exhaust steam, it is relieved to a condenser and the water salvaged. In the case of a deficiency of exhaust steam for auxiliary and plant process loads, the shortage is made up by automatic regulators and pressure reducing valves. Leslie pressure regulating valves and pressure reducing valves have been found very satisfactory for controlling the pressures on the exhaust system of the turbine.

This turbo-electric generator set generates alternating current at 440 volts, 60 cycles, 3 phase, which is carried by cables to the central distribution panel, located in the pump room near the center of the plant area. All power wiring to individual motors is carried from this panel. The distribution panel is a specially designed "dead front" board, and individual motor circuits are connected through Westinghouse De-Ion Fuseless breaker switches. All the starting switches are push button controlled and are mounted in the panel in the pump room. In the case of motors requiring remote start or stop control, the control lines are also brought to the main control panel.

The circuits are all equipped with two lights, a red and a green. The green light indicates the position of the overload relay and is lighted when the relay is "in." The red light indicates the motor or circuit in operation. All circuits are interconnected with relays wherever the machinery is arranged in a series operation, and the stoppage of one motor automatically stops all machines ahead of it. Such a stoppage is indicated in various parts of the ship by a siren sounding, and also a light to indicate the location of the shutdown. The "start" controls are connected, for safety, through a time delay warning signal system, so that a warning signal must be sounded before the plant machinery can be started. The switchboard was designed and constructed, in cooperation with the engineers of the Santa Cruz Oil Corporation, by the Westinghouse Electric & Manufacturing Company.

All electric conductors are rubber insulated, hose jacketed, and bronze braid armored, and were manufactured by the General Electric Company to conform to the requirements of the U.S. Steamboat Inspection rules. All electric push buttons, outlet boxes, and other fittings in the plant or on deck are fully protected from corrosion or wetting by being of watertight construction.

Electric motors range from ½ H.P. to 60 H.P. All the motors are of either totally enclosed and fan cooled, or splash proof construction. The type of motor is dependent upon the exposure, and wherever a motor is exposed to dampness the totally enclosed type is used. All motors are constant speed and arranged to operate on 3 phase, 440 volts, 60 cycle current.

● **Various Drives Used.**

Many types of drives are used, such as direct con-

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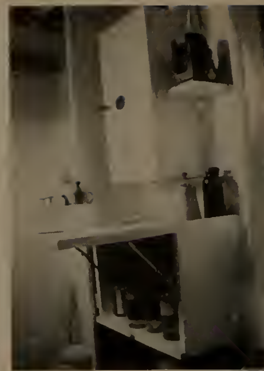

Test cabinet for Hall System.

Harvesting Marine Wealth

(Continued from Page 56)

nected motors, gear motors, and variable speed drives. The direct connected motors are practically all centrifugal pump applications. Gearmotors, supplied by the Westinghouse Electric Company, are used for powering machinery running at relatively slow speeds. The speed reduction gearing is totally enclosed with the motor and insures a satisfactory lubrication and freedom from dirt or water on the gears. Variable speed drives are used for machinery requiring a regulation of speed, and these are the well known Link-Belt P.N., powered with General Electric Company totally enclosed motors.

During the entire process of handling fish, and drying the meal, and separating the oil, it is necessary to apply heat. On the S.S. American Fisher the application of heat during the process is done as far as possible by closed systems, in order that the condensed steam can be recovered for boiler use. A closed system is not applicable to all heating requirements, and a great deal of the steam used is lost for re-use by mingling with the fish products.

The ability of a ship in the fish processing industry to remain at sea and function for long periods depends on the supply of water for boiler use and fuel. To make the use of water and fuel most effective was a primary object in the design, and the S.S. American Fisher has proved very economical in operation as to water and fuel consumption.

● Ventilation.

The arrangement and location of machinery and provisions for ventilation have received considerable attention in the design of the American Fisher. The objectives set down originally were to develop a plant that would be conveniently accessible for operation and maintenance; that could be easily and thoroughly cleaned, both during operations and when shut down; and that would be well ventilated during operations. Such an ideal objective would be difficult to achieve in its entirety, but the design has satisfied most of the desirable features. There are very few hot or uncomfortable areas in the plant, and these have been made very comfortable by ventilation fans planned and installed by the Rees Blowpipe Company. All ventilation is accomplished by removing the overheated air and blowing it out of the area, which produces a uniformly ventilated plant.

● Crew's Quarters.

A ship operating as a factory at sea carries the usual ship crew, and, in addition, a force of men to operate the plant. The plant force is organized much as in a shore located factory, with a superintendent, foreman, and shifts. On one of these ships there is a factory crew of about 44 men and a ship operating crew of about 29 men. This requires an increase to the usual steward's department of a tanker.

In the conversion of a ship from its ordinary condition to one equipped with a fish processing plant, many alterations and additions must be made to quarters for the personnel. Each department of the ship have their own quarter space, wash rooms, and mess rooms. All quarters on the American Fisher are finished with white enamel, and the metal trim is aluminum paint. These spaces are well lighted and ventilated and provide comfortable accommodations for the men of the crew.

The Hercules Equipment and Rubber Company, of San Francisco, supplied various special products in out fitting the American Fisher.

Exterior and interior surfaces of the American Fisher are protected by coatings of the American Marine Paint Company products.

A Submarine Signal Company Fathometer which is installed in the pilot house has been found of great value in spotting irregularities on the bottom of the Pacific.

The American Fisher is in constant touch with the office of her owners ashore through the latest type Mackay Radio equipment. This included a Type 1-19 B Intermediate Marine Frequency Transmitter and a standard Intermediate and Low Frequency Receiver. These are arranged to operate from an emergency power source in the event of any stoppage of the ship's electric power supply. An Exide storage battery is used for this purpose.

Nickel in the Marine Industry

The survey "Nickel Industry in 1936," prepared by Robert C. Stanley, president, International Nickel Company of Canada, Ltd., gives the following interesting facts on the use of nickel or nickel alloys on board ship:

The Queen Mary is a veritable exposition of the many ways in which nickel is used in making ocean travel both efficient and pleasant. From the engines to the instruments and from the kitchens to the most luxurious salons, nickel alloys have been employed in creating this new queen of the seas. A summary of nickel and nickel alloy applications in this liner is given in an appendix.

The use of 70/30 copper-nickel tubes in the condensers of the Queen Mary is an outstanding example of the recognition being given this material for its resistance to sea water. Its growing use for salt water lines in land installations is also noteworthy.

With the increasing amount of welding in ship construction, more attention is being given to welding problems, and in a number of successful solutions nickel alloys have been used. Whereas as late as a few

years ago, riveted construction far exceeded welded, today the picture has been reversed and, in some branches of shipbuilding, there are several times as much welded construction as riveted.

The resistance of inconel to salt water and spray has led to the use of inconel springs in marine equipment.

K Monel as a material for marine pump rods is receiving considerable attention and is being adopted for this use by some shipbuilders because of its strength, hardness and resistance to corrosion.

The 70/30 copper nickel alloy and the 75 copper-20 nickel-5 zinc alloy are now practically standard materials for certain types of marine condensers.

Inconel is being used for fire brick bolts and in link mechanism actuating sea valves.

The use of lightweight welded monel construction for salt water condenser heads and fresh water surge tanks, which was announced in 1935, has expanded rapidly. In addition monel is being used in increasing quantities for storage of boiler feed water and for lining the walls of refrigerated food storage rooms on large vessels. Development of a satisfactory technique for welding monel to galvanized steel structural members has been important in facilitating assembly and in achieving appreciable savings of weight.

The current year has brought the first recorded use of monel for steam turbine shafting. The shafting in question consists of solid K Monel shafts for rotors of light, high speed turbines directly driving propeller type pumps for salt water main condenser circulation. Shafting of both monel and K Monel has also been used for the rotors of electric motors driving direct-connected centrifugal pumps for fire and flushing service.

K Monel wearing sleeves for gland sections of monel pump shafting in marine service are being used with increasing frequency.

S Monel has been used for main steam valve trim on several new oil tankers designed for high pressure and high temperature service.

Monel castings have been adopted for an improved airport operating mechanism.

Monel sheet continues to be used in increased quantities for fresh water tanks and emergency ration containers for lifeboat equipment, because its resistance to corrosion assures purity of water and other supplies.

New uses for lightweight welded monel pipes include surge tank connections and escape piping from boiler safety valves. Monel escape piping is stronger than copper and more corrosion resistant than steel. It is also safer because of its resistance to sudden impacts such as are encountered when valves are tested or when they serve their intended function under abnormal operating conditions.

Pure nickel in the shape of nickel-clad steel fish holds for trawlers is now contributing to the rapid progress in supplying the public with fresher and more sanitary sea foods. This application is an outgrowth of the monel lined fish holds first introduced about six years ago. These demonstrated the economy of using sanitary corrosion resistant metal for the walls of cargo holds for fish.


At left, R. W. Giddings and above, R. W. Giddings, Jr.

Insulation and Packing Distributors

The R. W. Giddings Supply Company, of San Francisco, have for many years specialized as insulation contractors and distributors in the marine and industrial fields.

A comparatively recent appointment makes this firm exclusive marine and industrial distributor for the New Jersey Asbestos Company, manufacturers of the well and favorably known "V" Pilot packing in high pressure rod, low pressure rod, and sheet forms, for steam, water and ammonia uses; Gladiator Asbestos packing and Gladiator gaskets; Pilot expanding tube cleaners and refills for the same; and the full line of "Woodite" products.

An important distribution connection is the Cork Insulation Company. This connection gives Giddings a complete stock of the famous "Corinco" products, such as cork pipe coverings, acoustical cork board, tile cork board, and others.

Complete stocks are carried of: Ehret Magnesia Manufacturing Company insulation, pipe coverings, and refractory cements; Williams Rivers Valves, Vulcodisc Radiator Valves, and steam specialties of all kinds; and a complete line of machine shop tools, mill supplies, pipe and pipe fittings.

In all of these lines, this firm is not only a distributor but is prepared to contract for complete installation of any of the products it distributes.

R. W. Giddings has long been president of the company that bears his name. Recently, after serving in the shop and on the road, and after taking a trip to the Atlantic Coast, where he spent several months at the plants of the manufacturers for whom his firm is distributor, R. W. Giddings, Jr., was made vice-president.

Some Recent Northwest Tugs

A number of Cummins powered tugs have been placed in service in Northwest waters during the last two months. One of the latest is Joe Drinkwater III, owned by the Bloedel, Stewart, Welch Lumber Co.

Joe Drinkwater III measures 40 feet and is of wood construction. Her engine is a Cummins HML-6, equipped with a $2\frac{1}{2}$:1 Joes reduction gear. The governor is set at 1000 r.p.m., at which speed a full 55 h.p. is de-

(Page 64 please)

Recent Northwest Tugs

(Continued from Page 62)

veloped. This boat also acts as a supply tender and has a large open cockpit aft of the wheelhouse.

Parthia, owned by Delta V. Smyth, Olympia, Washington has recently been re-engined with a Cummins HMR-6, of the high speed type. She is equipped with a Seattle-built 3:1 reduction gear, which gives a propeller speed of 400 r.p.m. with the engine turning 1200, at which point a full 85 h.p. is developed.

Parthia works in and around Puget Sound, handling large rafts of logs and scows loaded with sawdust and finished lumber. The captain of the Parthia has been particularly enthusiastic over the Cummins engine because of its quiet operation. During the fall and winter there is considerable fog, and "whistle navigating" is the only means of getting around. The absence of general engine noise, coupled with an efficient silencer on the exhaust, has greatly reduced the hazard of navigation during the fog season.

A third Cummins powered tug, using the HMR-6 type of engine, is the all welded steel midget Jeanne (fully described in the November issue of Pacific Marine Review). She is owned by the Cowlitz Towing Co., of Kelso, and measures but 29 feet overall. This vessel is also in log towing service.

New Publication

"Chemistry Serves the Shipping Industry" is the title of a pamphlet distributed by Bull & Roberts, consulting chemists, 117 Liberty Street, New York City, treating of the various chemical problems arising in ship operation. Cargo stowage, ship sweat, air conditions, gas explosion risks, health protection, purchasing, and damage suits are among the general topics discussed; while in the engineering department, boiler feed water conditioning, corrosion, condenser efficiency, and testing of fuel and lubricating oils are taken up. It is stated that this publication will be followed by a series of monographs in which various individual investigations of interest to shipping men will be related. Copies may be had upon application.

PACIFIC MARINE REVIEW

Official Organ
Pacific American Steamship Association
Shipowners Association of the Pacific Coast

FEBRUARY 1937

25 Years of Turbines

Certificates and Discharge Books

California Shipbuilding—and the Sales Tax

PACIFIC MARINE REVIEW

FEBRUARY, 1937
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CONTENTS

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In New York City copies of Pacific Marine Review can be purchased at the news stands of I Goldberg, 42 Broadway, Jacob Fuchs, 17 Battery Place; Philip Mandara, Greenwich Street and Battery Place at 25c per copy

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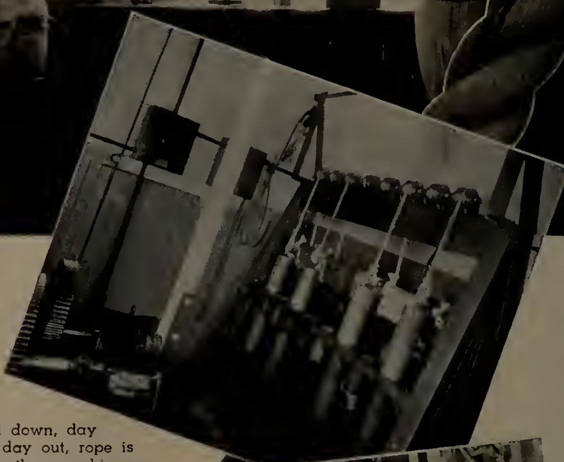

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PACIFIC MARINE REVIEW

VOLUME XXXIV — FEBRUARY 1937 — NUMBER 2

Editorial Comment »« »«

Sales Tax and California Shipbuilding

The U. S. Maritime Commission is ordered by Congressional Act creating that body: to study all the needs of the American Merchant Marine as an auxiliary of American sea-borne commerce and as a second naval line in national defense; to encourage the building by commercial shipowners of new vessels of modern types suitable for these purposes; and to build such vessels itself if commercial shipowners are slow in taking up the opportunities offered by the shipbuilding subsidy. Not yet four months old, this commission has already absorbed all the former Shipping Board offices and personnel and is smoothly functioning in its routine duties, while its technical staffs are busy studying ship types and their adaptation on American trade routes.

California has extensive shipbuilding facilities capable of handling most of the types and sizes of hull now being considered. The same act which created the Maritime Commission granted Pacific Coast shipyards a six per cent differential in bidding on ships to be built under shipbuilding subsidy. This differential is considered wise because of the evident naval necessity for maintaining adequate commercial shipbuilding plants on the Pacific Coast. Since several recent bids have demonstrated the ability of Pacific Coast shipbuilders to come within six per cent of the figures submitted by Atlantic Coast yards, it would seem that the Pacific Coast is in a very good position with regard to future shipbuilding.

California, however, has an unfavorable complicating factor in the State Sales Tax of 3 per cent, which, in competition with the great majority of Atlantic Coast yards, cuts the differential in half, and may easily drive shipbuilding contracts away from California shipyards. In the best interest of the industries, the wage earners, and the business men of California, this sales tax should be so modified that it would not apply on fabricated assemblies in the heavy industries. Indeed, such a modification would be greatly to the interest of the state government in the matter of total returns from the sales tax itself.

For instance, take a ship which is to cost, let us say, \$2,000,000. The California bid, without considering the tax, is 4 per cent higher than the low Atlantic Coast bidder, and should be awarded the contract. The 3 per cent tax makes the California yard 7 per cent high, and he loses the job, and California loses a hoped for \$60,000 of tax moneys. If, however, California remitted that \$60,000, and the contract came to a California yard, it could be shown that the circulation of the resultant wages to California citizens might multiply sales taxes to three or four times the single item of \$60,000 tax on the completed job. There are many industries in which this same argument would apply, but in shipbuilding the results are more striking because, in shipbuilding, a larger proportion of the total cost goes to labor than is the case in any other industry.

By insisting on the three per cent we drive the work away from the state and get nothing. By remitting the three per cent we attract the work to the state, and gain in actual tax returns considerably more than we have remitted.

Let's get rid of this 3 per cent bugaboo in the "heavy industries" of California.

Favorable Comment from an Old Friend

Mr. James S. Hines, Publisher
Pacific Marine Review — *January 15, 1937*
San Francisco, Calif.

Dear Mr. Hines:

I have read with interest your new Department "YOUR PROBLEMS ANSWERED by THE CHIEF" and consider this very helpful to the Junior Engineers coming up for their examination for the next high grade and of much interest to those in the engineering fraternity.

This is the type of constructive data that we of the engineering branch appreciate, and I speak from experience as I came up through this Department myself.

Good luck to you, and I know that this new department in Pacific Marine Review will be received with a lot of interest by the boys in the engine room.

Very sincerely yours,
R. L. Hague.

The Officers' Club

In the January issue of Pacific Marine Review appeared an "Open Letter to American Marine Licensed Officers," advocating that they assume their rightful position afloat and ashore as self-respecting American gentlemen, worthy of the great honor and responsibility delegated to them by their government and their employers. The letter proposed the formation of an "Officers' Club" in San Francisco as a very vital and effective start towards this goal for the Pacific Coast marine officers.

The responses to the open letter were immediate and numerous. All the responses were very favorable to the idea. A meeting of interested officers has been called and preliminary plans for organization of the Officers' Club are being prepared. When these are ready they will be submitted to active licensed officers for their comment and decision. Before long this dream is going to be an accomplished fact, not only in San Francisco but in every important American port.

Comment, constructive criticism, practical ideas, and or suggestions for an official name will be given careful consideration by

The Officers' Club,
Room 701, 500 Sansome Street
San Francisco.

Pacific Representative of Maritime Commission

E. C. Mausshardt is now district representative of the United States Maritime Commission in charge of all activities in the Pacific Coast territory, from Seattle to San Diego.

Since May, 1928, Mr. Mausshardt was district manager of the U.S. Shipping Board at San Francisco, and has been continuously with the Board since 1918—one of the pioneers and veterans in that organization. He first entered the "USSB" service at Philadelphia, then was transferred to New York, and later to Norfolk. In 1924 he was sent to San Francisco and for four years was in charge of the reserve fleet. In May, 1928, he was promoted to complete charge of all West Coast affairs.

Thoroughly trained and efficient, "Eddie" Mausshardt is a San Franciscan and is proud of it! Eastern papers try to show him "Atlantic," but such is not the case. He was born in San Francisco, schooled here, apprenticed here. For fourteen years he served in ships of the historic Pacific Coast Steamship Company. Next he had two years with the famous old Oceanic Steamship Company. At another time he was with the Black Stack tugs here.

Pacific Marine Review Twenty-Five Years Ago

Still flaunting the signal "Be Just and Fear Not," Pacific Marine Review ("First Established and Only Exclusively Marine Paper Published on the Pacific Coast") issued the second number of its ninth volume on February 15, 1912, from 379, 380 Arcade Annex, Seattle, Washington.

One lead article dealt with "An opportunity for Port Improvements," and advised the Port Commission of the City of Seattle to close with the offer of Eastern capital to build a large terminal on Harbor Island.

Another leader enlarges on the probable influence of the opening of the Panama Canal on world commerce.

A third discusses the report of U. S. Commissioner of Navigation Chamberlain, who proposed that all ships be put through the canal free and some method found of assessing on the various their just proportion of the costs.

Considerable space is given to the Admiralty Court decision on the famous collision between the White Star liner Olympic and the cruiser Hawke in the Solent in September, 1911.

It was recorded that "Last year (1911) witnessed the most remarkable activity in shipbuilding in all marine history." In that year there had been built 2199 vessels, aggregating 3,568,076 gross tons, and these vessels were equipped with propulsion power plants generating a total of 4,113,469 horsepower. "One company alone, the Hamburg-American, is building 21 steamers, aggregating 236,000 gross tons, which will give the line a total of 1,256,150 tons, the largest tonnage under any one house flag."

Much shipping legislation was pending in Congress and was noted in the February, 1912, issue of Pacific Marine Review, but the discussion on this legislation runs through the entire year and we will take it up as conclusions are reached in later issues.

Of interest in Pacific Coast shipping history are the following notes:

Hind-Rolph and Company announced their appointment as general agents at San Francisco for the Union Steamship Company of New Zealand.

Moore and Scott reported a very successful installation of their "Improved High Pressure Oil Fuel System" aboard the Norwegian steamer Jason, and the receipt of several orders from other owners.

Sailing vessel fixtures of interest are: The Kirkcudbrightshire, Portland, Oregon, to Europe, 32s 6d, wheat; the L'Herniette and the Bossuet, Portland, Oregon, to Europe, 31s 3d, wheat; the James Tuft, Puget Sound to Sydney, 43s 9d, option of Brisbane, 46s 3d, or Chile, 52s 6d, lumber; the Amaranth, Puget Sound to Chile, 50s 6d, lumber.

Certificates and Discharge Books

Complete Text of Rules and Regulations Issued by Bureau of Marine Inspection and Navigation for the Issuance of Certificates of Service and Efficiency and of Continuous Discharge Books, Being Federal Register Document No. 3936

By virtue of the authority prescribed by sections 1 and 7 of the act of June 25, 1936 (Public Law No. 808, 74th Congress, 49 Stat., p. 1930), the following rules and regulations are prescribed for the carrying out of the provisions of section 1 of the foregoing act of June 25, 1936, amending section 13 of the Seamen's Act of March 4, 1915 (38 Stat., p. 1169), and section 3 of the said act amending section 4551 R. S., relative to the issuance of certificates of service to able seamen, certificates of efficiency to lifeboat men, certificates of service to qualified member of the engine department, certificates of service to persons other than able seamen and qualified members of the engine department, and continuous discharge books.

● Sec. 1. General

(a) An applicant for any of the above certificates, or for a continuous discharge book shall make written application, in duplicate, on Form 719-b, furnished by the Department of Commerce. The placing of finger or thumb prints on the application shall be optional with the seaman. This application may be for as many certificates or ratings for which the seaman believes he is qualified. In the case of a seaman applying for his first certificate, the application shall include a request for a continuous discharge book.

(b) An applicant for a certificate of service for a rating other than as able seaman or qualified member of the engine department shall take oath before one of the local inspectors that he will faithfully and honestly perform all the duties required of him by law and carry out all lawful orders of his superior officers on ship-board.

(c) Every person employed on any merchant vessel of the United States of 100 tons gross and upward, except those navigating rivers exclusively and the smaller inland lakes, below the rank of licensed officer, shall have a certificate of service issued by a board of local inspectors.

(d) When the application is submitted for a continuous discharge book and one certificate of service, the seaman shall furnish four (4) unmounted photographs ($1\frac{1}{2}$ x 2 inches) taken within 1 year. The photograph shall show the full face at least 1 inch in height, and shall show the bare head.

(e) When the application is for a certificate of service only, three (3) such photographs shall be furnished. When additional certificates are requested, one (1) additional photograph is required for each additional certificate.

(f) The applicant shall produce with his application, discharges or affidavits as documentary evidence of his service, indicating the names of the vessels on which he has had service, in what capacity, and on what waters.

(g) All existing certificates of service as able seaman or certificates of efficiency as lifeboat man, shall be surrendered, effective December 26, 1936, or at such later date as may be fixed by the Secretary of Commerce, as authorized by the Act.

(h) All applications for certificates of service or efficiency shall be presented by the applicant in person to a board of local inspectors.

(i) If the applicant possesses a continuous discharge book, it shall be exhibited to the board.

(j) Applications in the form hereto attached will be furnished to applicants for certificates of service and efficiency and continuous discharge books[1].

● Sec. 2. Continuous Discharge Books

(a) Every seaman employed on any merchant vessel of the United States of 100 gross tons or over (except vessels employed exclusively in trade on the navigable rivers of the United States) shall be issued a continuous discharge book upon application therefor, which shall be retained by him. This book will bear a number, and this same number shall be shown on all certificates of service or efficiency issued to the holder of the book. The term "navigable rivers" shall be held to include all waters over which a vessel inspected and certificated under the General Rules and Regulations prescribed by the Board of Supervising Inspectors for "Rivers" is permitted to be navigated.

(b) The shipping commissioner or collector or deputy collector of customs, at ports where no shipping commissioner has been appointed, shall fill in the information required in the continuous discharge book, which information shall be taken from the application, Form 719-b, and shall include the name of the seaman in full, his date of birth, personal description, statement of nationality, home address, and grade and number of licenses or certificates held. He shall also attach the seaman's photograph in the size and style herein required, impressing his official seal partly over same, and witnessing the seaman's signature. Care must be taken that the above information is correctly entered.

(c) Every seaman, as referred to in subsection (a) of this section, shall produce a continuous discharge book to the U. S. Shipping Commissioner before signing articles of Agreement, and where the seamen are not signed on before a shipping commissioner the continu-

ous discharge book shall be produced to the master of the vessel at the time of his employment, as follows: As to vessels engaged in foreign and intercoastal voyages, 6 months after the enactment of the act, and as to all other vessels within one year after the enactment of the act. When a seaman has lost his book and has made application for a duplicate book, he may produce a Temporary Certificate of Discharge, Form 719-A, in lieu thereof.

(d) Only black ink shall be used in making entries in continuous discharge books.

● Sec. 3. Able Seaman

An applicant for a certificate of service as able seaman shall be at least 19 years of age and meet the following service requirements;

(a) Three years' service on deck at sea or on the Great Lakes on vessels of 100 gross tons or over to which sec. 1 (a) of the act of June 25, 1936, amending sec. 13 of the act of March 4, 1915, applies, including decked fishing vessels and vessels in United States Government service of such tonnage. (Green Certificate—Any Waters.)

(b) Graduates of school ships approved by and conducted under rules of the Secretary of Commerce who have served 12 months at sea following graduation. (Green Certificate—Any Waters.)

(c) 12 months on deck of such vessels at sea or on the Great Lakes. (Blue Certificate—Any Waters—holders of certificates under this provision being limited to one-fourth of the number required by law to be employed on a vessel.)

(d) 18 months' service on deck at sea or on the Great Lakes, smaller lakes, bays, or sounds on vessels of 100 gross tons or over to which sec. 1 (a) of the act of June 25, 1936, amending sec. 13 of the act of March 4, 1915, applies, including decked fishing vessels and vessels in United States Government Service of such tonnage. (Blue Certificate—When used on the high seas, holders of certificates under this provision being limited to one-fourth of the number required by law to be employed on a vessel.)

(e) No candidate for certificate of service as able seaman shall be examined until he presents an official certificate of a physician of the United States Public Health Service that his eyesight, hearing, and physical condition are such that he can perform the duties required of an able seaman, and that his color sense is normal.

(f) Before such a certificate is issued to any applicant, he shall prove to the satisfaction of the board of local inspectors, both by oral examination and by actual demonstration, that he has been trained in all the operations connected with the launching of lifeboats and life rafts, and the use of oars; that he is acquainted with the practical handling of the boats themselves; and, further, that he is capable of taking command of a boat's crew. If convenient to Board and applicant, written examination may be given in lieu of oral examination.

(g) The examination shall consist of questions regarding lifeboats and life rafts, the names of their essential parts, and a description of the required equipment; the clearing away, swinging out, and lowering of boats and rafts, the handling of boats under oars, including questions relative to the proper handling of a boat in running before a heavy sea, in pulling into a sea, etc.; the construction and functions of gravity, radial, and quadrantal types of davits. There shall also be included questions concerning the applicant's knowledge of nautical terms; boxing the compass, either by degrees or points according to his experience; running lights, passing signals, fog signals for vessels on high seas, in inland waters, or on the Great Lakes depending upon the waters on which the applicant has had service; distress signals; knowledge of commands in handling the wheel by obeying orders passed to him as "wheelsman" and knowledge of the use of engine room telegraph or bell-pull signals.

(h) In the actual demonstration, the applicant shall show his ability by taking command of a boat and directing the operation of clearing away, swinging out, lowering the boat into the water, and acting as coxswain in charge of the boat under oars. He shall demonstrate his ability to row by actually pulling an oar in the boat. He shall also demonstrate knowledge of a few of the principal knots, bends, splices, and hitches in common use by actually making them.

(i) All existing certificates of service as able seamen shall be surrendered, effective December 26, 1936, or at such later date as may be fixed by the Secretary of Commerce, as authorized by the act, and the above regulations for the issuance of certificates of service as able seamen, when affecting a person surrendering a bona fide certificate and applying for a new certificate in lieu thereof, shall be modified in the following respect:

No physical examination shall be required unless the applicant in the opinion of the local inspectors obviously suffers physical defects appearing to render him incapable of performing such duties; and no further examination shall be required if the local inspectors are satisfied—from the statements submitted by him in his affidavit and application, or from other evidence—that the applicant is qualified as an able seaman. The local inspectors shall also satisfy themselves that the applicant surrendering the certificate is the bona fide holder thereof before issuing a new certificate.

● Sec. 4. Lifeboat Man

(a) An applicant for a certificate of efficiency as lifeboat man shall have the qualifications and satisfactorily pass the examination prescribed by the existing rules and regulations of the Board of Supervising Inspectors. The certificates shall be issued to successful applicants by the local inspectors.

(b) All existing certificates of efficiency as lifeboat man shall be surrendered, effective December 26, 1936, or at such later date as may be fixed by the Secretary of Commerce, as authorized by the act, and a new certificate will be issued in lieu thereof, upon application therefor. No further examination shall be required if the local inspectors are satisfied — from statements submitted by him in his affidavit and application, or from other evidence—that the applicant is qualified as a lifeboat man. The local inspectors shall also satisfy themselves that the applicant surrendering the certificate is the bona fide holder thereof before issuing a

new certificate.

Sec. 5. Qualified Member of the Engine Department

(a) A qualified member of the engine department is any person below the rating of licensed officer and above the rating of coal passer, or wiper, who holds a certificate of service as such qualified member of the engine department issued by a board of local inspectors of the Bureau of Marine Inspection and Navigation. An applicant for a certificate of service as qualified member of the engine department shall have had at least 6 months' service at sea in the engine department of a vessel required to have certificated men and shall produce satisfactory documentary evidence of such service.

(b) No candidate for a certificate of service as a qualified member of the engine department shall be examined until he presents a certificate of a physician of the United States Public Health Service, or reputable physician acceptable to the local inspectors, attesting that his eyesight, hearing, and physical condition are such that he can perform the duties required of a qualified member of the engine department.

(c) Before such a certificate is issued to any applicant, he shall prove to the satisfaction of the board of local inspectors by an oral examination that he is trained in the duties required by his certificate. If convenient to board and applicant, written examination may be given in lieu of oral examination.

(d) Examinations shall consist of the following:

Fireman.—Applicant shall be examined on boiler operation, especially on oil burning systems and the hazards due to the accumulation of oil in the furnaces or bilges, or on fire room floors and tank tops. He shall have a good working knowledge of the use of water feeding devices, water indicators, pressure gages, safety valves, etc.

Oiler.—Applicant shall be given an examination on the operation of propelling units and lubricating systems and shall have a knowledge of the use of telegraphic or other maneuvering signals, also of the operation of auxiliaries.

Water tender.—The applicant shall be required to pass an examination on pumps, heaters, injectors, or other methods of feeding, also on burners and other equipment connected with fuel systems. He shall also be examined as to the maintenance of a safe water level in the boilers, the piping and connections used in the feed and blow-off systems, and the hazards incurred from low water. He shall also have a thorough knowledge of the engine and fireroom fire fighting equipment.

Deck engineer.—The applicant shall be examined as to his knowledge of auxiliary machinery, such as winches, anchor windlasses, steering gear, etc., also telemotors and fire extinguishing apparatus for cargo holds and confined spaces on deck.

Refrigerating engineer.—Applicant shall be examined as to his knowledge of the principles of refrigeration, the operation and maintenance of refrigerating machinery, and the hazards which prevail in the use of certain refrigerants, also as to his knowledge of how to act in any emergency, such as the accidental release of the refrigerant into the refrigerating space.

(e) An applicant holding a certificate of service for a particular rating as qualified member of the engine department and desiring certification for another rating covered by this same form of certificate may, upon qualifying therefor, have endorsement made on the back of his certificate covering such certification.

(f) Personnel employed in the engine department of vessels covered by sec. 1 (e) of the act of June 25, 1936, amending sec. 13 of the act of March 4, 1915, and having the required sea service of 6 months on the effective date of these regulations need pass only the oral examination provided herein. No physical examination shall be required unless the applicant, in the opinion of the local inspectors, obviously suffers physical defects appearing to render him incapable of performing such duties.

Sec. 6. Certificates of Service for Other Ratings

(a) Certificates of service shall be issued to applicants for ratings other than able seamen or qualified members of the engine department, which certificates shall authorize the holders thereof to serve in the capacity specified therein. The applicant, however, shall produce satisfactory evidence to the local inspectors of his ability to perform the duties of the position for which he desires to be certificated.

(b) An applicant for a certificate of service as radio operator shall produce to the local inspectors his unexpired license to act in that capacity from the Federal Communications Commission.

(c) No examination will be required for such certificates of service except that applicants for ratings contemplating the handling of food shall produce a certificate from a physician of the U. S. Public Health Service, or a reputable physician acceptable to the local inspectors, stating that he is free from communicable disease.

(d) An applicant for a certificate of service as deck boy shall produce a certificate from a physician of the U. S. Public Health Service, or reputable physician acceptable to the local inspectors, that he is qualified physically.

(e) No holder of a certificate of service as a deck boy may receive a certificate of service as ordinary seaman until he shall have had an aggregate of 6 months' service as deck boy.

(f) An applicant holding a certificate of service for a rating other than able seaman, or qualified member of the engine department, and desiring certification for another rating covered by this same form of certificate may have endorsement made on the back of his certificate covering such certification, without examination; except that, if the endorsement is for a rating contemplating the handling of food the applicant shall produce a certificate from a physician of the U. S. Public Health Service, or reputable physician acceptable to the local inspectors, stating that he is free from communicable disease.

Sec. 7. Rules for Preparation and Issue of Certificates

(a) Upon application of any person for a certificate of service or efficiency, it shall be the duty of the board of local inspectors to give the applicant the required examination as soon as practicable in every case where an examination is required.

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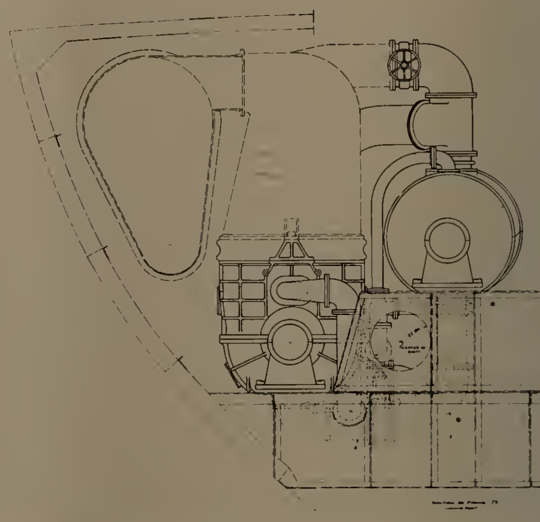
Twenty Years of Geared Turbines

By W. Edgar Martin

During a period of about twenty years the geared turbine form of propulsion has developed steadily, until today we have a unit of machinery perfected to the point where it is reliable, economical, comparatively of light weight, and takes little space. It has become almost the standard method of propulsion for most of the moderate size and larger vessels built in the United States. During this past twenty years, marine steam conditions have changed from generally about 200 lbs. pressure, 28 to 28.5 inches vacuum, and about 75-degrees superheat to more than 400 lbs. pressure, 29 inches plus vacuum, and 200-degrees superheat.

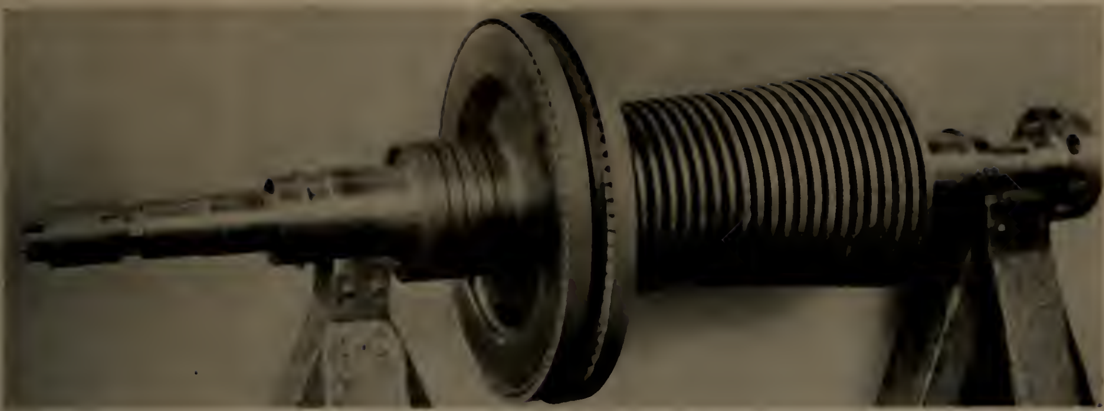
Looking backward for a moment, twenty years ago, in 1916, Westinghouse installed geared turbine propulsion in the Matson Navigation Company's Maui. This was the first geared turbine to be installed in a passenger ship in the United States, and although quite different from the modern designs of today, the same geared turbines are propelling the vessel at the present time. The Maui is a single reduction gear installation of 5,000 shaft horsepower per screw. Her turbines operate at 1920 revolutions per minute and, with 225 pounds steam pressure and 50-degrees superheat, have a water rate of 10.7 pounds per shaft horsepower per hour.

As an interesting comparison, let us look at one of the 1936 models of a Westinghouse geared turbine drive. Take one of the fourteen 3100 horsepower units in the seven new Coast Guard cutters, or one of the units about the same size being installed in tankers for Gulf Refining and Standard Oil Company of New Jersey. The high and low pressure units of the Coast Guard cutters operate at 6000 and 4500 r.p.m. respectively and, with 375 pounds steam pressure and 642 degrees F. total temperature, have a water rate of only 7.5 pounds per shaft horsepower per hour. This is truly a remarkable improvement, when it is considered that at the same time the steam consumption was improved, the weight was reduced, the dimensions made



Elevation arrangement of port turbines on Maui.

The famous cargo and passenger liner Maui of the Matson Navigation Company, first merchant vessel to install geared turbines.



Modern high pressure turbine spindle with shrouded blading.

smaller, and the general reliability much improved.

● **Reliability:—Prime Consideration**

Reliability of the propelling unit is the most important consideration to the steamship operator, and it is interesting to note the reasons why these new units are more reliable.

First. The better materials available today make an important contribution, from which full advantage has been obtained. The advance made in metallurgy, such as the general use of chromium steel in the new designs, is also a contributing factor.

Second. These new 1936 models, using double reduction gears, are designed for higher speed turbines than are installed in the Maui. This factor, of course, permits using much shorter blades. Even the double reduction geared installations following the Maui at that time did not use as high turbine speed as at present. With the newer materials, using higher blade speeds, lower stresses can be obtained, contributing to better reliability as well as economy. The higher speeds permit using smaller spindles and cylinders, which reduces the chance of blades rubbing and distortion taking place.

Third. Protection against blade rubs is guarded against in the shrouding strips, which are welded to the ends of the blades. This shrouding of corrosion resisting steel reduces the blade tip losses and also protects the blades.

Fourth. The use of conically bored turbines, giving straight steam passage without the so-called steps of blade groups, is an important improvement over the Maui design of turbine, which has become a Westinghouse standard feature of design.

A vast amount of work has been done by Westinghouse engineers at South Philadelphia in their experimental laboratory, determining matters of blade shapes, location of lashing wires, stresses developed at various

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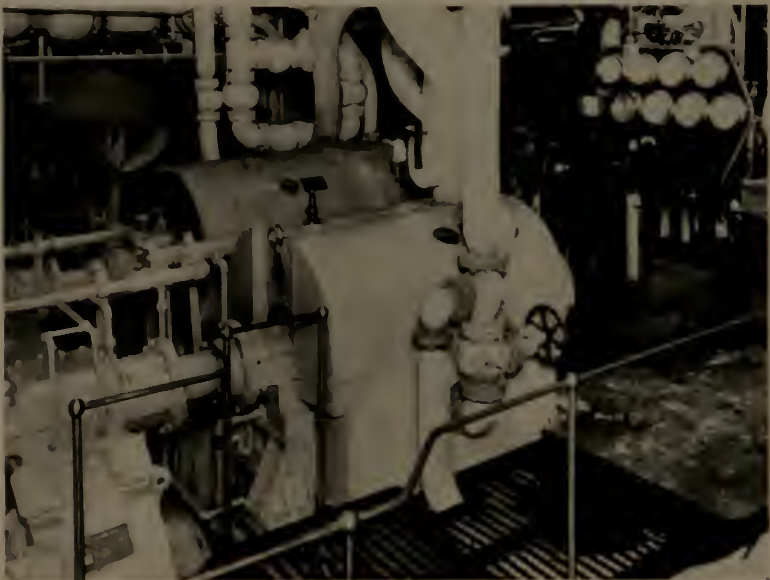
Here is the latest type Westinghouse marine propulsion double reduction geared steam turbine, as installed on the tanker Gulfbelle. Compare this compact double unit mounted on top of its condenser with the Maui arrangement of 20 years back as shown on facing page. Note the elimination of huge steam and exhaust connections.



World Shipbuilding in 1936

By H. Gerrish Smith,

President, National Council American Shipbuilders

During 1936 merchant ship construction in the United States increased considerably over the very low ebb of 1935, due to contracts for oil tankers and a large number of miscellaneous small craft. At the end of the year there were under construction 24 seagoing vessels each of 1,000 gross tons or over, with a total gross tonnage of 161,740, as compared with 16 seagoing vessels of a total gross tonnage of 92,074 at the end of 1935.

On the basis of Lloyd's reports of vessels of 100 gross tons or over building in the various countries of the world, the participation of the United States in the building of merchant vessels was about 4.3 per cent as of September 30, 1936, as compared with less than 1 per cent in September, 1935.

At the end of 1936, in the private shipbuilding yards, there were 39 naval vessels under construction with a total displacement tonnage of 160,794, as against 46 naval vessels with total displacement of 182,024 at the end of 1935.

Taking into account both commercial and naval tonnage, employment in the industry is at the highest level that has obtained at any time since the completion of the World War shipbuilding program.

Notwithstanding greater activity in the shipyards, there have been no orders placed during the year for any seagoing vessels of the cargo, combination, or passenger type—a deplorable situation when it is realized that the cargo vessels in our foreign trade fleet will average about 17 years of age out of an average useful life of 20 years. They are nearly obsolescent but are still trying to compete with the up-to-date vessels of other maritime nations. The only hope for their replacement at an early date rests upon the working out of the shipping problems placed upon the Maritime Commission created under the Merchant Marine Act of 1936. Aside from this Act, which makes possible the reestablishment of the Merchant Marine in foreign trade on a sound basis, other legislation was passed granting greater powers in the design and inspection of ships to the Bureau of Marine Inspection and Navigation.

More legislation affecting shipping was passed by the 74th Congress than by any other Congress in recent years. Its effect upon shipping and upon the shipbuilding industry will depend upon the character of the administration of the laws enacted.

While the United States has stood still in the building of vessels for the general cargo and passenger trade, other countries have been very active in such building. A survey by the United States Shipping Board Bureau, as of July 1, 1936, shows the following vessels, each of 2,000 gross tons or over, under construction in the principal maritime nations.

Country Where Building	Number of Vessels	Gross Tons
Great Britain	128	876,701
Germany	46	370,179
Sweden	29	173,218
Japan	24	154,064
Netherlands	16	153,032
Denmark	16	90,212
UNITED STATES	10	88,390

The survey above referred to shows that on July 1, 1936, there were under construction in the principal maritime nations of the world 288 seagoing vessels, of which 177 were freighters, 82 were tankers, and 29 were of the combination passenger and cargo type. All commercial vessels under construction in the United States at that time were oil tankers.

Taking account of merchant vessels of all sizes, down to 100 gross tons and over, Lloyd's Register of Shipping shows that during the first nine months of 1936 keels for the following vessels were laid in five principal countries:

Country Where Building	Number of Vessels	Gross Tons
Great Britain	269	808,021
Germany	150	421,630
Japan	78	184,939
Holland	61	104,924
UNITED STATES	47	99,628

While the United States' share in this tonnage was much greater than a year ago, it is still regrettably small in comparison with that of other leading maritime nations, when taking into account the fact that the United States is the largest exporting nation in the world.

In these countries, during the same nine months' period, the following vessels, each of 100 gross tons or over, were launched:

Country Where Launched	Number of Vessels	Gross Tons
Great Britain	233	574,320
Germany	116	285,578
Japan	70	165,320
Holland	50	61,568
UNITED STATES	32	40,547

● Naval Construction

The report of the Secretary of the Navy for the fiscal year ending June 30, 1936, shows that at that time there were 79 naval vessels under construction in the

United States, of which 41 were building in private yards and 38 in navy yards.

● Employment in Shipbuilding

Trends in employment on new construction during 1936 were reflected by the following figures, based on the reports of 32 private establishments which furnished information to the National Council of American Shipbuilders.

Date	Employment On New Construction
January 1, 1936	21,599
April 1, 1936	23,421
July 1, 1936	25,947
October 1, 1936	27,176

● Great Lakes and Rivers

During the year there was one contract placed with a Great Lakes shipyard for the construction of an oil tanker of 6,500 gross tons for the Standard Oil Company of Indiana. There was also great activity on inland rivers in the building of barges and small craft.

● Shiprepairing

During the calendar year 1936 there was an appreciable average increase in activity in those shiprepair yards which are members of the National Council, which the records of employment on the respective dates are as follows:

Date	Employment On Shiprepairing
January 1, 1936	9,346
April 1, 1936	9,651
July 1, 1936	12,175
October 1, 1936	10,919

● Idle Tonnage

It is gratifying to note that during the year there was a substantial reduction in world idle tonnage from 4,196,000 gross tons on January 1, 1936, to 3,752,000 on July 1, 1936. At the present time the volume of world idle tonnage is only 27 per cent of what it was on July 1, 1932, at which time approximately 20 per cent of the entire world fleet was laid up.

● Safety of Life at Sea

The United States Senate finally ratified the International Convention of Safety of Life at Sea on August 7, 1936, which would make it effective November 7, 1936. The ratification was accepted and became operative as of November 7, 1936. All of the signatory powers have now ratified it, as well as seventeen other countries.

● Future Outlook

The future outlook for shipbuilding depends very largely upon the success of the Maritime Commission in working out the problems imposed upon it under the Merchant Marine Act of 1936. The shipyards of the United States, with their present facilities, are in a position to handle any program of building likely to develop in peace times in meeting the requirement for new ships to maintain and upbuild our shipping services. There are 67 available ways for the construction of seagoing vessels in existing operating shipyards, and 30 more ways that could be made quickly available at small expense, in case of necessity.

Twenty Years of Geared Turbines

(Continued from Page 23)

blade speeds, and performance of materials under steam conditions that might be encountered in practice.

● Better Accessibility

The modern electric welded construction of gear cases and condensers has eliminated certain possibilities of using castings with concealed defects. Contributing greatly to the reliability is the better accessibility of these new type geared turbines. Note the many inspection plates, and the comparative ease of disassembly and assembly for regular inspection. This, of course, reduces to a minimum the possibility of failure due to excessive wear, lack of sufficient lubrication, or other contributing factors. Designing for accessibility has most certainly added to the reliability. One example of this accessibility is found in the gear bearings, which may be adjusted by removing bearing caps only, requiring no disassembly of the gears or casing.

The increased economy of operation is found not only in the difference in steam consumption cited above, but in the reduction of maintenance required. Modern methods of securing blading have minimized blading troubles. Improved designs of carbon glands have added to both the reliability and economy of maintenance.

The new model has achieved a decided reduction in weight per horsepower, accompanied by a decided improvement in reliability. If equal progress is maintained, by 1956 "Twenty more years of geared turbines" will indeed be an interesting topic to the marine world.

Certificates and Discharge Books

(Continued from Page 21)

(b) Upon satisfactory completion of the prescribed examination, the board of local inspectors shall prepare an original of each certificate which shall be delivered to the applicant. The board shall complete one stub record to be forwarded to the Bureau in Washington, together with the original copy of the completed application. Another stub record shall be completed and retained in the local office.

(c) Before delivery of the original certificate, the inspectors shall place one of the photographs in the proper position upon the certificate, and the seaman shall affix his signature partly over his photograph on the certificate in such manner as not to deface or obscure any of the features, and shall likewise affix his signature to each of the stubs. The seaman may at his option impress his left thumb print on the back of the certificate and upon each of the stubs. When the seaman has no left thumb, the imprint of the right thumb may be used and that fact noted.

(d) Each certificate shall be impressed with the seal of the issuing board, placed partially over the signature and photograph of the applicant. Each member of the issuing board shall affix his signature. The name

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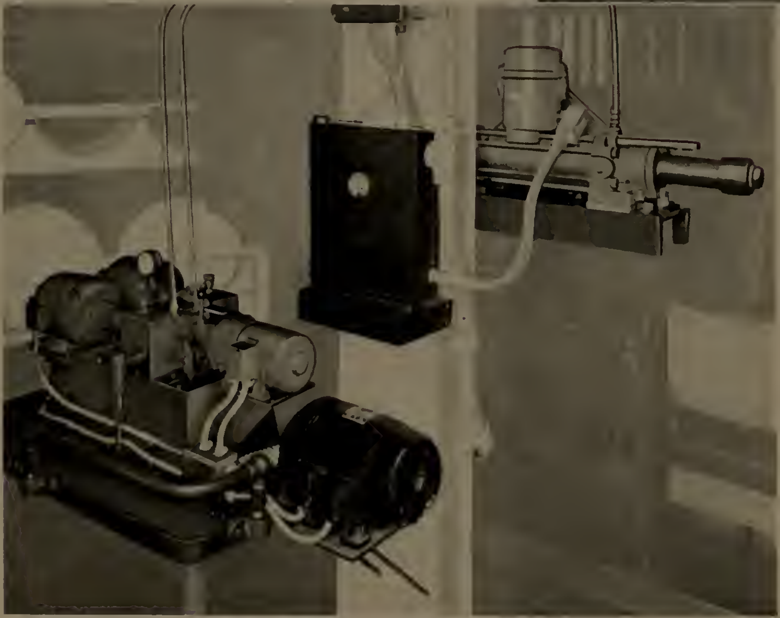
Steady As You Go

Being Some Notes on a New Idea in Steering Control for Seagoing Vessels

By F. S. Hodgman

More than six hundred vessels now sail the broad highways of the world with Sperry steering control. From the mightiest express liner to the lowly but no less important towboat, from the largest lake and ocean carriers to the smallest work boats, Sperry equipment has been fashioned for each to steer "steady as you go." Over a period of fifteen years the installations made in this group of vessels have afforded a background of experience which is unparalleled in the industry. Each has been a separate problem, and each has contributed to the fund of detailed knowledge upon which all successful design must be based. Here has been the most conclusive proving ground in the world—these hundreds of Sperry-equipped vessels in daily service—and it has served well to prove the design principles thus evolved.

It is only natural that so many years of study and development applied to ship's steering gear should have provided a long list of basic improvements in steering engines and control. Such a list would include the Gyro-Pilot for surface vessels, submarines and aircraft, ship's course broadcasting systems, the electro-mechanical steering system, variable voltage control systems, the ballast control system for electric steering, the automatic equalizing valve for ship's telemotors, and the thermionic control system, each in turn



Above: Wheelhouse of the George F. Rand showing Sperry Steering Control, Gyro-Compass Repeater, left.

George E. Rand is a self-unloading Great Lakes Carrier recently converted from a bulk cargo carrier at the Loraine plant of the American Shipbuilding Company.

At left: After unit comprising pump, oil cylinder with transmitter and control panel, installed in the steering engine room of the Rand.

devised by Sperry to remedy the shortcomings of existing equipment or to fill a need not previously met.

The technical experts of the Sperry Gyroscope Company have had ample opportunity to study the problems presented by the various conventional methods of maintaining this control under all the varying circumstances encountered at sea. It is generally agreed that the alpha and the omega of any system of rudder control should be reliability. In all the conventional systems used for such control, reliability is only possible through a very rigid and constant system of inspection and maintenance. Installation and maintenance costs are heavy, and are becoming more heavy as the addition of fittings and automatic gadgets make the systems more complicated. One of the chief difficulties with the conventional systems is their lack of basic self-synchronism, by which expression we mean that the rudder does not align itself with the steering wheel under all conditions but must be aligned therewith by manual adjustment. These systems do not include a supplementary method of steering; cannot transmit to steering engine as much power as a man can put into the steering wheel; and are not readily adaptable to multiple steering stations in various parts of the ship.

The answer to this problem is presented in the form of the new Sperry Steering Control.

The mode of operation of the Sperry Control can be described in a very brief space. The steering engine valve is moved by hydraulic power derived from motor driven pumps and applied by means of an oil cylinder and a control valve. The valve, in turn, is controlled electrically from the wheelhouse. Thus, as the wheelhouse control is moved, the oil cylinder moves the rudder in like amount. Continuous agreement between rudder and wheel is accomplished by a standard selsyn transmission in which a transmitter on the steering engine valve energizes a similar receiver at the steering wheel to maintain synchronism. Local hydraulic control is provided at the steering engine and a supplementary non-follow-up controller in the wheelhouse. Stand by battery protection is available in the form of a standard throw-over panel.

The Sperry Control is new only in the manner in which standard units have been combined. Each unit has been proven in detail by years of steering gear service to insure that the system as a whole shall meet the most exacting standards of reliability and performance.

The qualities and advantages of this new system are listed as follows:

1. With regard to cost of installation and maintenance the small nine-wire armored cable which connects Sperry units can be installed and maintained for a fraction of the cost of comparable systems.

2. The wheelhouse control is clean and completely noiseless in operation. There are no exposed pipes, gravity tanks, or oil leaks in the wheelhouse.

3. The system is not susceptible either to sudden or gradual failure, by virtue of its small stand-by battery which continues to supply energy when all other circuits have failed.

4. There are no exposed pipes or linkages between stations; hence it is secure against mechanical damage and wear.

5. There can be no creepage between the rudder and the wheel, nor is it ever necessary to align the system under any condition.

6. No rubbery response or back lash will be found but instead an instant follow-up movement of the rudder each time the wheel is moved.

7. Only two valves are used, a relief valve for maintaining pressure at the pump unit and a control valve for admitting pressure to the power cylinder.

8. The Sperry Control is unique in the sense that it is completely self-synchronous. The rudder aligns itself with the wheel under all conditions. If two or more steering stations are provided at different parts of the ship, control may be instantly transferred from one to the other, and the rudder immediately aligns itself with the new control station.

9. The Control will continuously position the steer-engine valve gear within ½ degree under all conditions, and at the same time provide full follow-up steering.

10. Important units throughout the system are duplicated, in keeping with modern steering gear practice.

11. A supplementary steering control is provided in the wheelhouse which cuts itself in automatically in case of wheel failure and permits emergency steering, lighting a warning light to indicate that control has been transferred. This supplementary controller is also available for use, instead of the wheel, at any time it may be desired.

12. The hydraulic power which is applied at the steering engine valve is derived from a duplex motor driven pump instead of a man's effort. The largest steering engine may thus be precisely controlled with no more effort than the smallest.

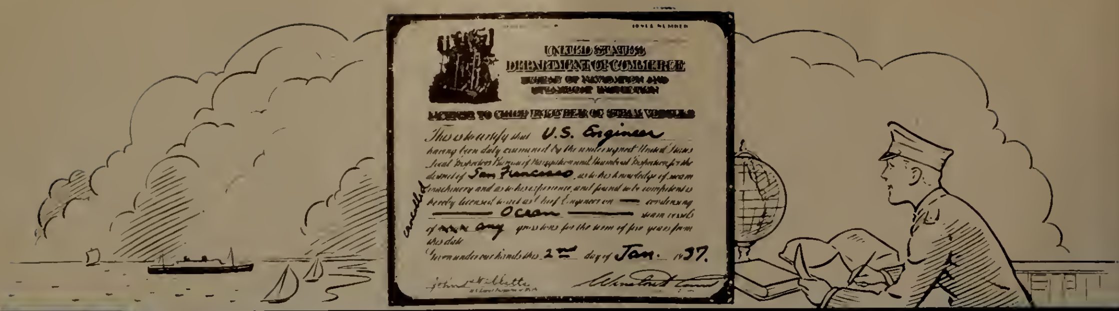
13. Control units may be made as small as desired, even to the extent of a portable unit, or they may be made of ample size to support the weight of the helmsman in a sea-way.

14. Multiple steering stations may be installed at small cost, and the transfer between stations may be accomplished by a simple throw-over switch.

15. Sperry Control may be arranged to parallel existing rod gear or telemotor installation in such fashion that either system is always ready for instant use—with full change-over control in the wheelhouse.

16. It is adapted for use with any type of steering engine.

[Abstracted from article appearing in December, 1936 issue of "Sperryscope"]



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

Our illustration shows the famous torpedo boat Turbinia, which carried the first seagoing steam turbine propulsion engines. The principal points of interest in this early installation are:

1. The date of the early work with marine steam turbines.
2. The small size and high speed of the ship.
3. The almost unbelievable speed of the propellers.
4. The high pressure and vacuum for that early date.
5. The economy of the engines, approximately equal to that of the reciprocating engines of the time.

H.M.S.S. TURBINIA

Here is the original seagoing turbine steamer, the Turbinia. Built in England in 1894 and engined with turbines designed and built by the late Sir Charles Algernon Parsons, this boat made 31.01 knots on her trials, December, 1896, and in January, 1900, made 34.5 knots.

She had a triple expansion turbine plant, the rotor of each of the three turbines being directly connected to a propeller shaft. Speed of turbine rotors, shafts, and propellers at full power would average 2100 R.P.M.

Her water tube boilers were designed for 225 pounds gage pressure, with 1100 square feet of heating surface, 42 square feet of grate area, and forced draft. The condenser had 4200 square feet of cooling surface and was served with circulating sea water by scoops. Total weight of machinery was 22 tons.

The hull was: 100 feet long; 9 feet beam; made of steel with 3/16-inch plates bottom and forward tapering to 1/16-inch sides and stern; and having 44½ tons total displacement. Her steam conditions on trial were: 200 pounds gage pressure; 130 pounds throttle pressure; and no superheat. Vacuum was 27½ inches. Under these conditions, the plant produced 2300 indicated horsepower, with a steam consumption of 15.85 pounds of steam per horsepower hour, and a fuel consumption of two pounds of coal per horsepower hour.

● The Steam Turbine

The advantages of the steam turbine were recognized early in the history of the steam engine. A Swedish engineer named De Laval used it for practical purposes in driving high speed centrifugal machines many years before the Turbinia. Today, his name is closely associated with this type of engine.

Parsons recognized the following principal advantages over the reciprocating engine:

1. Light weight of turbine per unit of capacity.

2. Ability to use high vacuum by arranging space for the large volume of steam.

3. Obtaining high speed for those applications requiring it. (The reciprocating steam engine was limited in practical marine work to speeds of not more than 400 r.p.m.)

● Only Source of Mechanical Work

Except from falling water in hydro-power plants, the expansion of a hot gas in an engine is our only source of mechanical energy, our only method of unlocking Nature's storehouse of energy in the form of fuel. The reason is, that we know of no method other than combustion to release the energy of fuel and start it on its down grade fall to the low grade (low temperature) form. Happy indeed will be the engineer who discovers a method of converting coal or oil directly into the useful form of energy, preferably electrical, without going through the transformations of high grade (high temperature) heat, hot gas expansion, and reciprocating or rotating motion in the parts of an engine.

● Expansion of Steam

Dry steam is a hot gas and behaves like any other gas heated to high temperature and pressure. The energy of the fuel has been transformed into high grade heat energy in the steam plus a small amount of potential or stored energy in the mechanical form due to the

pressure difference between the boiler and condenser. This energy may now be transformed, in part, into energy of motion, turning a shaft against the resistance of a load. We may allow a small amount of steam to enter a cylinder, trap it, allow it to expand in the cylinder by pushing a piston connected through a crank to a shaft. This is the reciprocating engine. In the theoretically perfect engine, all of the energy available[1] in the steam is transformed into an equivalent amount as rotation of the shaft.

There is another way to use the expansion of steam to get mechanical energy. If we allow it to escape from a port or opening in its container the available energy is converted into energy of motion by accelerating the mass or weight of the steam to a definite velocity or speed of motion.

The energy of any moving weight is expressed[2] by the formula $E = \frac{VW^2}{2g}$ where E is the energy content of moving weight in foot pounds; W is the weight in pounds; V is the velocity in feet per second; and g is the gravitational constant and is 32.2 feet per second per second. Hence 2g has a value of 64.4.

Now, if we symbolize the value of the available energy in the steam per unit weight, say one pound, we have: $E = 778\ (H_1 - H_2)$ where E has same meaning as before, except energy available **per pound** weight of steam, in foot pounds. H_1 is total heat energy per pound in steam (at temperature and pressure of boiler or steam header) in British Thermal Units, usually designated B.T.U. H_2 is total heat energy in steam (at temperature and pressure of exhaust or condenser) in B. T. U.

Or expressing this same idea verbally we would say that the difference in heat energy content at beginning and at end of expansion is numerically identical to the heat transformed into energy of motion or mechanical energy.

But we have already shown that energy of motion is numerically identical to $\frac{WV^2}{64.4}$. We are therefore permitted to say that: $\frac{WV^2}{64.4} = 778\ (H_1 - H_2)$. As shown in the last article, 1 B. T. U. is equivalent to 778 foot lbs. The weight W is stated as unity or 1 pound, hence becomes 1.

If, now, we want to change this expression to show what velocity V would be obtained, we are permitted to interchange the symbols thus[3] $V^2 = 64.4 \times 778\ (H_1 - H_2)$.

Taking the square root of both sides, we have:

$V = \sqrt{64.4 \times 778} \times \sqrt{H_1 - H_2}$

$V = 223.7 \sqrt{H_1 - H_2}$ feet per second.

If we assume $H_1 - H_2$ is 225 B. T. U., which would be very ordinary as temperatures and pressures are regularly used, we have:

$V = 223.7 \sqrt{225} = 223.7 \times 15 = 3355.5$ feet per second.

This is a terrific speed, when we realize that the velocity of a high powered rifle bullet is approximately 3000 feet per second. Yet this is obtained from a steam pressure of approximately 350 lbs. per square inch discharging through an opening or orifice into the atmosphere. Of course, it is quickly slowed down on impact and friction with the relatively stationary air and steam around it.

The velocity of a jet of water issuing from an orifice or nozzle is expressed by the equation $V = \sqrt{2gH} = \sqrt{64.4H}$ where V is velocity in feet per second. H is the head in feet of water above the nozzle. The pressure in pounds per square inch would be .434 H, thus $V = \sqrt{64.4 \quad .434P}$ where P is pressure in pounds per square inch. So the velocity of a jet of water with 350 lbs. per square inch just back of the nozzle would be 99 feet per second.

Compare this with the jet of steam, which, at 350 lbs. per square inch, gave a spouting or jet velocity of 3355.5 feet per second. Note that the formula for velocity in both cases takes into consideration only the energy content per pound of the steam or water in foot pounds of energy. In the case of the water the head H is the same as the foot pounds per pound of weight, as $E = WH$ where E is energy in foot pounds per pound. W is the weight, H is the head in feet or height to which the W weight of water was elevated. But W is 1 pound, hence $E = H$.

The general equation for the theoretical jet velocity of any fluid or gas may be stated as $V = K\sqrt{64.4E}$ where V is velocity in feet per second, K is numerical constant to adjust the units used, and E is energy content per pound.

Actual velocities, however, never attain their theoretical values, which is consistent with so many other characteristics familiar to us in our practical experience. With steam, actual velocities will be from 85 per cent to 95 per cent of the theoretical values, dependent on the pressures and nozzle shapes involved. This means that from 72 per cent to 90 per cent of the energy is converted to velocity; the remainder goes back into heat in the steam due to friction on the walls of nozzle and on itself. Note that this is not altogether a loss if we can convert the heat energy back into velocity later in other nozzles at lower pressures. (There is some loss in available energy, however. This will be discussed in later articles.)

(1) The available energy may be from 10 to 50 per cent of that in the steam, the remainder is lost in the condenser. This will be fully discussed in later articles on the theory of heat, with an analysis showing how much and why. Suffice to say at present that it is dependent on the pressures and temperatures at the boiler and condenser.

(2) The engineer is encouraged to study and understand formulae, which are simply a shorthand or abbreviation of technical expression using letters as symbols to represent definite ideas or thoughts, therefore a quick and brief way of expressing exact relationships between different values. Two letters side by side, thus WV, mean that their numerical values are to be multiplied together or W+X, to be added, or thus W − V, to be subtracted, or $\frac{W}{V}$ to divide the upper value by the lower value; or thus V^2 means that the value is to be "squared" or multiplied by itself once, hence VV, or V^3, to multiply by itself twice, or VVV, called "cubed." This symbol = means that the numerical values on the left of the symbol are identical or equal the values on the right hand side.

(3) This change is accomplished by multiplying both sides of the equation (identity) by the same value, in this case 64.4, which removes it from below the line on the left, but puts it in as a multiplier on the other side. If we add, subtract, multiply or divide, **both** sides of an equation by any number or value, we do not change the identity or equality of the two sides. We may also square or cube or extract the square root or cube root of both sides without affecting equality, at the same time change the equation to a useful form.

● Jet Forces

Now let us consider the numerical values of the forces involved with these velocities. If a weight is moving at a uniform velocity in a straight line without friction, no forces are involved. We have forces only in accelerating the weight (starting or bringing it up from a slower to a higher velocity), or in decelerating the weight (slowing it down or stopping). This is exactly the case with a jet; we start with each pound of steam at practically standstill in the steam chest, then suddenly it finds itself in front of the opening or nozzle, with full steam pressure back of it, and it is accelerated immediately to its high jet velocity.

The force of acceleration is $F = \frac{WA}{32.2}$ when F is force in pounds causing the acceleration; W is the weight in pounds; A is acceleration in feet per second per second, that is, the increase (or decrease) in velocity or rate of change of velocity.

This can easily be proved if we allow a weight to fall and measure its fall accurately as to velocity and time in seconds. We find that, at the start, the velocity is zero, at the end of the first second it is 32.2 feet per second, and at end of second second is 64.4 feet per second and soon, each second adding 32.2 feet per second to the already acquired velocity. Furthermore, if we disregard air friction, this is the case regardless of the amount of weight used. The greater the weight used to cause the acceleration, the greater the weight which has to be accelerated. Galileo, the famous Italian scientist, first recognized this truth and was imprisoned for teaching something that appeared so preposterous. They thought, in those days, that the greater the weight the faster it would fall.

This acceleration, due to gravity, 32.2 feet per second per second, sometimes written as 32.2 ft./Sec.^{2} and referred to symbolically as g, appears in many formulae because of its basic relationship. By substituting numerical values in the equation $F = \frac{WA}{32.2}$ when using gravity as the force, we have for any weight W[4]:

$$W = \frac{W \times A}{32.2} \text{ or } A = 32.2 \text{ ft./sec.}^2.$$

To show that this force required to start or stop a mass is universal, it can be said that an object falling toward the surface of the moon, where the gravitational pull is about 1/6 that of the earth, would have an acceleration of

$$F = \frac{WA}{32.2},\ F = 1/6,\ A = \frac{32.2F}{W},\ A = \frac{32.2}{6} = 5.4 \text{ ft./sec.}^2$$

approximately. Then, it would take over 1 second for an object to fall from the top of your desk to the deck.

● Nozzle Reaction Forces

Probably every engineer has seen a discharging air hose lash back and forth under the influence of the reaction force of the jet. Or has seen three or four fire fighters struggle to hold a discharging water jet. The forces are all subject to these formulae. Let us compute the value of the force on our steam nozzle due to the jet:

$V = AT$ or $A = \frac{V}{T}$ where T is time in seconds and for 1 second $A = V$.

$F = \frac{V}{32.2}$ when W is 1 pound.

Thus the force, backward on the nozzle (called **reaction** force), would be, for our 350 pound per square inch jet:

$$F = \frac{3355.5}{32.2} = 104.2 \text{ pounds.}$$

If we allow the nozzle to move backward under the influence of this force, such as, for instance, fastening it to the rim of a wheel and supplying steam to it through the shaft, we have a source of mechanical energy. This would be called a turbine. Suppose we allow the nozzle to move backward at a velocity V = 3355.5 feet per second. The jet would then be stationary in space, just a gentle breeze of steam instead of the tornado of kinetic energy it was. Its energy has been transformed into the mechanical form of a force moving through a distance.

The force will not, however, be the amount shown in this formulae, because some of it is required to bring the steam from its stationary condition in the pipe, up to the velocity of the nozzle, before it passes through the latter. This energy, C, is, as we know:

$$C = \frac{WV^2}{2g}, \text{ or, for 1 pound, } C = \frac{V^2}{2g}$$

Energy available from the moving nozzle is: $E = FD$. Here D is distance traveled in 1 second; therefore $D = V$ and $F = \frac{V}{g}$, hence $E = \frac{V}{g} \times V = \frac{V^2}{g}$ and $C = \frac{V^2}{2g}$.

Thus E is twice as much as C, or only ½ of E is available to do work. $\frac{E}{2}$ is net energy, hence corresponding force is $\frac{F}{2}$.

If we allow the nozzle to move at twice jet velocity, or 2V, we have

$$C = \frac{(2V)^2}{2g} = \frac{4V^2}{2g} = \frac{2V^2}{g}, \text{ and}$$

$$E = FD = \frac{V}{g} \times 2V = \frac{2V^2}{g} \text{ or } E = C.$$

Both being equal, there is no net energy and no net force available, hence, twice jet velocity is the ceiling or terminal (maximum) velocity at which a nozzle would move under its own reaction force.

Briefly, reaction force is:

1. F pounds when nozzle is stationary.
2. $\frac{F}{2}$ pounds when nozzle moves at jet velocity.
3. 0 pounds when nozzle moves at twice jet velocity.

● The Net Energy of Jet

$E \text{ net} = \frac{F}{2} D$. F, as we have seen above, is 104.2 pounds for each pound of steam at 350 pounds pressure per square inch. Therefore E net = 52.1 × 3355.5 = 175,000 foot pounds per second.

(4) Here is brought out a difference between mass and weight. The mass, that characteristic of matter which causes it to resist change of motion, is constant for all time and places. The weight, gravitational pull, varies from place to place on the earth and other celestial bodies. Generally, on the earth, the weight is numerically the same as the mass; the variation from place to place is small.

A Modern Motor Coaster

Recently delivered, and now in regular operation between San Diego, California, and Manzanillo, Mexico, is the new Maierform hull diesel engined coastwise cargo and passenger vessel Ensenada. This vessel, designed by William Lambie, naval architect, of Wilmington, California, was built by Gutenhoffnungscheutte, of Walsum, Germany, for a Mexican shipping organization headed by General Abelardo L. Roderiguez, former president of Mexico.

Built under special survey of Lloyd's Register of Shipping, this vessel has a steel hull of the single deck type with poop and forecastle, is rigged with one steel pole mast fitted with two wooden cargo booms, and has a very nicely molded cruiser stern and a decided Maierform bow.

Her principal characteristics are as follows:

Length overall	138' 0"
Length between perpendiculars	130' 0"
Beam molded	26' 0"
Depth molded	11' 6"
Deadweight cargo capacity	400 tons
Fuel Oil Capacity	30,000 gallons
Passenger capacity	12
Shaft horsepower	450
Sea speed loaded	10.75 knots

The hull is divided into five main compartments by four watertight bulkheads. These compartments, in order from bow to stern, are: The forepeak, arranged as a fresh water tank; a deep tank for fuel oil; the cargo hold, arranged with one large hatch 12 feet wide and 22 feet long; the engine room; and the after peak tank, arranged for fresh water. A double bottom is fitted under all spaces between the forepeak and the afterpeak tanks. This bottom forms several tanks used for fuel oil bunkers.

Ensenada ready for her trials. Note Maierform bow.

Ensenada on the stocks showing stern lines, rudder and propeller.

A specially designed Oertz streamline rudder is fitted under the cruiser stern. This rudder is operated by a right and left hand screw gear actuated through rods and gears by a hand wheel in the pilot house.

The propulsion power plant consists of one 450 brake horsepower, reversible, M. A. N. diesel engine, directly connected by shaft to a single bronze four-bladed propeller of the Airfoil type. One five-kilowatt electric generator driven off this main engine supplies ample power for lighting the ship, driving small electric equipment in the galley, driving the fresh water circulating pump, and driving the fuel oil transfer pumps.

Two independent 12.5 kilowatt generators, each driven by a diesel engine, are installed in the engine room for generating the additional power that is required for the two electric winches, located on the after end of the forecastle deck, that serve the two 2-ton cargo booms.

Ensenada carries ten nicely fitted staterooms, a dining saloon, a galley, baths, and toilets, in the deck house on the poop. Six of these rooms are for passengers and four for officers. The captain's quarters are on top of this house, just aft of the pilot house. The forecastle is very spacious, and is fitted with comfortable berths for 16 men.

On her voyage out from Germany the vessel was loaded to her marks with cement, and, though she met some rather heavy weather, she was found to be very seaworthy and very easy to handle and maneuver. From Europe to the Canal she averaged 10.1 knots. When she is running at full speed there is a "total absence of disturbance" at the stern.

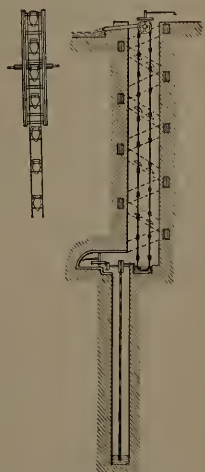
While Ensenada is essentially a coastwise cargo and passenger motorship, her performance will be watched with great interest by many shipowners on this coast. She is the first vessel with a Maierform fore body to be especially designed for coastwise service in the Pacific.

Pumps—from Ancient to Modern Times

By E. L. Mathy

1st Vice President, Victor Equipment Company

When, twenty-seven centuries preceding the birth of Christ, K'Hufu erected the great pyramid of Gizeh; when, a thousand years later, the great Hebrew patriarchs, Abraham, Isaac and Jacob, founded new Biblical traditions; when, again, ten centuries later, King Solomon's reign ends and the Phoenicians had just devised their alphabet, and the great epic poetry of the Greeks—of Homer — was to be written a century later; pumps — crude ones, perhaps, had been used by man.



Early chain pump used in Joseph's well, Cairo.

To trace the development to its earliest historical beginning would lead us beyond the early dawn of recorded history—beyond the earliest fixed date determined by the invention of the calendar by the Egyptians in 4241 B.C.

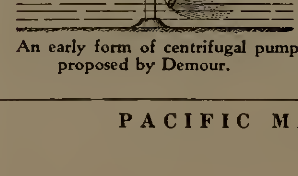
When man emerged from the late Stone Age and that of the Hunter and entered the era of the Shepherd, he had to devise means of raising water from wells where no pure streams were available to him. The gradually approaching age of Agriculture accelerated the demand for water pumping equipments and, logically, the perfection of these devices.

The cultural developments of Egypt and China appeared to have progressed quite simultaneously, and so the earliest forms of pumps—of which we have knowledge—were the shadoof, used in Egypt, and the noria, used in China. These primitive water raising devices were merely earthen, woven or leather buckets, crudely fastened onto beams made of tree limbs which, in turn, were tied to cross beams supported by tree trunks planted at the edge of some running or still water. The arm supporting the bucket was counterbalanced by rocks or other natural weights. The device was manually operated by submerging the bucket and then lifting it to a sufficient level where its load of water could be emptied into a canal conveying it to the area to be irrigated.

A somewhat more serviceable pump, of basically similar design, was the doon, which consisted of a long trough pivoted onto an overhead horizontal beam, which was counterbalanced. The operation was simple enough—a man would dip the outer trough end into the running stream, filling the longer and center portion of the overhanging trough. Having so filled it, the operator would push the trough and the overhanging balancing beam upward, aided by the counterweights.

Perhaps one of the first pumps that gave a more or less continuous flow of water during operations was the very ingenious "zig-zag" pump used in Asia Minor and Egypt. The apparatus consisted of a post or tree trunk erected in the center of the stream. Onto this beam were fastened two movable "zig-zag" pendulums so constructed that the lower end of the one would dip into the water as the lower end of the other one would be simultaneously raised out of the water. This double pendulum was moved back and forth by two men, one standing on either side of the stream. As the men pulled the double pendulum back and forth the water was caused to travel backward and forward in the trough-like pendulum sections, of which each horizontal one became shorter as it rose to the upper end, where each pendulum would discharge its stream of water into a trough.

Another interesting Egyptian pump of this early era is the tympanum, which was perhaps one of the first pumps using a reverse principle of that upon which our modern horizontal centrifugal pump impeller is based. The tympanum was a water wheel on the face of which was mounted a series of spiral tubes converging towards the wheel hub and a tube that passed through the hub and carried the water into a trough. As the water wheel is turned by the flowing water, the open end of any one of several spiral tubes scoop up water and convey it by rotation and gravity to the center of the hub and into the hub tube, from whence it was conveyed into a trough and a ditch.



An early form of centrifugal pump proposed by Demour.

A number of these illustrations are reprinted by permission from "Pumping Machinery" by Greene, published by John Wiley & Sons, Inc.

Right: Sakias (Persian wheel)

Left: Doon pump, another early water lifting apparatus, with long trough.

Some 200 years before Christ, Archimedes gave us the historically important Archimedean screw—the first combination of a movable diaphragm in a tube. By turning the tilted screw manually, the water must necessarily travel upwards and be discharged into a trough. Nearly 2000 years later we shall again run into a screw type pump, which, however, will be installed vertically and will utilize centrifugal force and mechanical power.

Obviously an article of this length may not cover the innumerable pump types evolved during untold centuries, nor does it seem feasible adequately to condense the very comprehensive data accumulated in a great many very interesting books covering this historical development.

The so-called "chain pumps" have been used in China since the earliest record of history. A very interesting one of this chain or bucket type is "Joseph's Well," at Cairo. The date of origin is unknown, but the well is approximately 300 feet deep. This well is built in two sections. The upper 150 feet is of a wide diameter and is equipped with a spiral path on which draft animals could be led down to the 150 foot level. On this level a second 150 foot shaft began. On each of the tops of the two 150 foot shafts bucket pumps were fastened and motivated by draft animals.

Leonardo da Vinci, perhaps the world's foremost architect, artist and engineer, contributed, among his innumerable accomplishments, in the 15th century, a pump design notable for its utilization of moving pistons.

A century later, in 1581, the first "London Bridge Water Works" was installed. This was a lift pump propelled by the waters of the Thames. Three water wheels, each 20 feet in diameter, were supported on heavy frames so as to permit them to be lowered and raised by the tides. Connected onto each wheel, by various lantern wheels and vibrating levers, were sixteen pumps. These pump cylinders were 4 feet 9 inches long and 7 inches in diameter, and were provided with foot valves. The maximum pumping rate, at full tide, was 46,896 hogsheads per twenty-four hours. It may be interesting here to record that Peter Morrys was given a grant by the Lord Mayor of London, for a term of 500 years, to supply water to houses by piping, under condition that he pay ten shillings annually to the Chamber of London. Later he secured a second grant for 2000 years, and the Water Works were extended considerably.

The earliest development of the so-called centrifugal pump probably dates back to the middle of the 17th century, but its first successful application was apparently accomplished by McCarty, who operated his own design in New York in 1830. McCarty's centrifugal pump was produced in Boston and was spoken of as the "Moss Pump." It was essentially similar to our modern horizontal centrifugal pumps, excepting that the impeller vanes were parallel to the radial lines and were placed on each side of the disc.

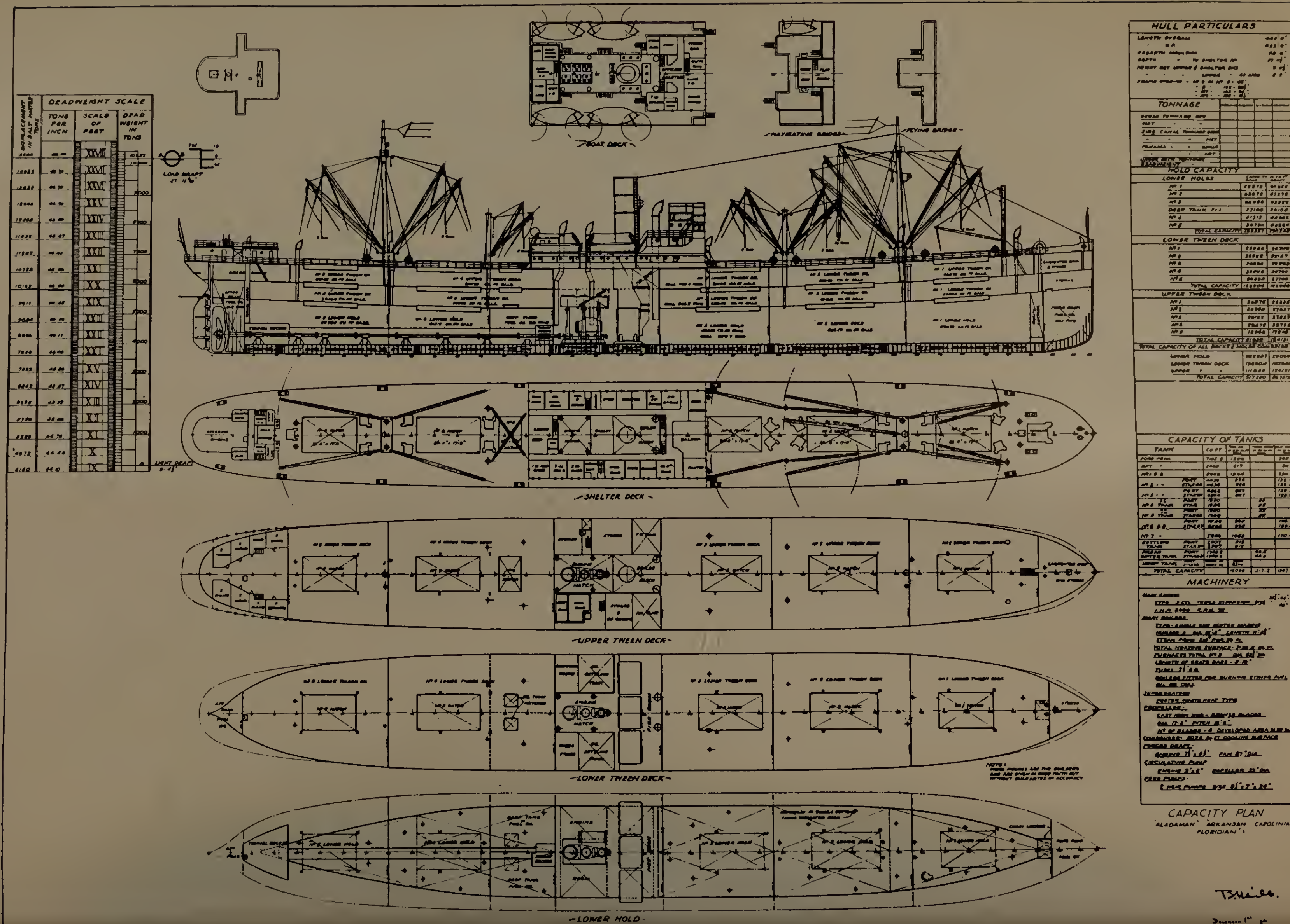
A few years later an improvement was made by Blake and Andrews in America and, simultaneously, by Appoldt, Thompson and Gwynn in England. In 1846 Andrews produced a pump with curved impeller vanes of the identical basic construction of the ones now prevalent.

Principal forerunners of this impeller type of pumps were the so-called rotary pumps, which seemed to date back to the 16th century, of which one was designed by Watt.

(Another installment of Mr. Mathy's article on the development of pumps will appear in an early issue.)

Left: Zig-zag balance pump of Asia Minor and Egypt.

Right: Tympanum, a pump developed in an early era in Egypt



HULL PARTICULARS
TONNAGE
HOLD CAPACITY
LOWER HOLDS
LOWER TWEEN DECK
UPPER TWEEN DECK
CAPACITY OF TANKS
MACHINERY
DEADWEIGHT SCALE
TONS PER INCH
SCALE OF FEET
DEAD WEIGHT IN TONS
DISPLACEMENT IN SALT WATER TONS
LOAD DRAFT
LIGHT DRAFT
BOAT DECK
NAVIGATING BRIDGE
FLYING BRIDGE
SHELTER DECK
UPPER TWEEN DECK
LOWER TWEEN DECK
LOWER HOLD
CAPACITY PLAN
"ALABAMAN" "ARKANSAN" "CAROLINIAN" "FLORIDIAN"

American-Hawaiian Augments Fleet

Four Fine Cargo Vessels of 40,000 Tons Aggregate Deadweight Capacity Added to Intercoastal Service

Last year the American-Hawaiian Steamship Company purchased from the Dollar Steamship Company four sister ships. These four steamers were the Diana Dollar, the Margaret Dollar, the Melville Dollar, and the Stuart Dollar. All four were built for the United States Shipping Board Emergency Fleet Corporation at the Kiangnan Dock and Engineering Works, Shanghai, China, and were respectively christened, when launched in 1921, the Cathay, the Celestial, the Oriental, and the Mandarin. Together with the ships of the former Williams Line, the acquisition of the four Dollar ships gives the American-Hawaiian Steamship Company a fleet of 33 vessels for intercoastal service and 8 vessels for the Oriental service, or 41 able cargo carriers under the one house flag.

To bring the four latest vessels up to American Hawaiian standards, and to equip them under the revised rules of the U. S. Bureau of Marine Inspection and Navigation, was one of the largest reconditioning contracts placed on the Pacific Coast in recent years. The total cost was between \$450,000 and \$500,000.

The Moore Dry Dock Company, of San Francisco and Oakland, California, was the principal contractor on three of the steamers, and the other was overhauled at Todd Dry Dock, Seattle, Washington. The following description of the work involved and the equipment and material supplied is with particular reference to the three vessels reconditioned at the Moore Dry Dock Co.

Principal Characteristics:

Length overall	443' 0"
Length between perpendiculars	429' 0"
Beam molded	55' 0"
Depth to shelter deck	37' 11½"
Height, upper to shelter deck	7' 11½"
Height, upper to lower deck at side	8' 5"
Main propulsion engine:	
One triple expansion engine	
Cylinder bores	26½"-44"-74"
Stroke	48"
Speed	75 r.p.m.
Indicated horsepower	2600
Boiler plant:	
Three single end Scotch marine	
Diameter	15' 3"
Length	11' 3¾"
Pressure	210 lbs.
Tubes	2½ inches O.D.
Heating surface total	9124.5 sq. ft.
Fitted to burn either fuel oil or coal.	
Propeller cast iron hub, bronze blades:	
Diameter	17' 3"
Pitch	16' 6"
Number blades	4
Developed area	91.89 sq. ft.
Speed at sea	10.5 knots

The rudder posts of American-Hawaiian steamers are formed to Contra Propeller design, which adds greatly to propulsive efficiency and aids rudder action.

The hulls were, of course, the first consideration. In order to be sure of all rivets, seams, and plates the bottoms were not only scraped clear of all marine growths and loose paint, but they were sand blasted down to the clean steel wherever the slightest suspicion of pitting or looseness was in evidence. On one hull bottom 26,000 square feet of surface was sand blasted to clean steel. From fourteen to fifteen thousand rivets per ship were found to be needing attention, and these were tightened by welding.

On the decks, all composition covering was completely removed and the steel decks carefully examined for corrosion. Considerable areas in way of crew's and officers' quarters were renewed by welded patches, making the decks complete, as good as new.

The crew's and officers' quarters were virtually rebuilt to conform to the very high standard of American Hawaiian in its care for marine personnel. On the

general arrangement plan herewith it will be noted that the crew's space is aft under the poop deck house. The entrance to these quarters is through a thwartship passage with companion stairs port and starboard. Two bathrooms and two lavatories open off this passageway.

Space, on the deck below, is arranged with a large central living room and eight bedrooms. Five of these rooms are fitted for two men each, and three for three men each. The rooms all have berth lights, mirror lights, fan outlets, and fans. They are all steam heated, and the walls and ceilings are covered with Case Plastic Cork, which not only insulates them from outside cold or heat, but also eliminates formation of moisture by sweating of the steel.

The living room is well lighted and ventilated and is furnished with a large table, comfortable chairs, shelves for books, and other equipment calculated to make a long voyage comfortable. The floors in crew's quarters are covered with Case Magnesite, a waterproof, elastic, fire and rust resistant product with great wearing quality. In the baths and lavatories the floors are covered with Case Tile. All of the weather decks on tops of superstructures are protected by Case Weather Decking of the new non-skid type. All of this flooring and weather decks were furnished and installed by L. S. Case Inc., San Francisco.

The entire machinery installation in each vessel was thoroughly overhauled, and much of the main steam piping was renewed. Many Crane cast steel valves were installed in this process. All of the original cargo winches were replaced by Lidgerwood $8\frac{1}{2}$-inch x 8-inch steam winches. King posts were installed forward of the forward hatch, and two additional winches installed to serve the cargo booms on these posts. All winches were supplied through Thos. J. Baird, of San Francisco. Spare propeller shafts for each vessel were supplied by the General Engineering Company, of San Francisco. Spare hubs for propellers were cast and machined by the Moore Dry Dock Company.

All of the electric wiring, the electric fixtures, the generators, and the motors were completely overhauled by the Toumey Electric and Engineering Company, of San Francisco. All wiring was practically renewed, and many new fixtures and outlets installed. The lighting fixtures and ventilating fan outlets in crew's quarters have already been mentioned. Other new outlets and lighting fixtures include: special deck lighting for safe working conditions; the installation of Kane lighting fixtures in the cargo holds; and many new lighting outlets in engine room, boiler room, and storeroom spaces. Toumey Electric and Engineering Company overhauled and rebuilt the mechanical engine room telegraph system and installed (to comply with the new rules of the U. S. Bureau of Marine Inspection and Navigation) a Bendix Sound Powered intercommunicating telephone system.

All of the ships were equipped with new lifeboats. Two boats are installed on each side of each vessel. Each pair of boats has ample capacity to take care of the entire normal personnel on the ship.

American-Hawaiian Fleet

1. SS Alabaman	ex Diana Dollar	ex Cathay
2. SS Alaskan	" Wheaton	
3. SS American	" Santa Barbara	
4. SS Arkansan	" Margaret Dollar	" Celestial
5. SS Arizonan	" Willhilo	" Conshohocken
6. MS Californian		
7. SS Carolinian	" Melville Dollar	" Oriental
8. SS Coloradan	" Willboro	" Eastern Admiral
9. SS Columbian	" Santa Clara	
10. SS Dakotan		
11. SS Floridian	" Stuart Dollar	" Mandarin
12. SS Georgian	" Willsolo	" Cajacet
13. SS Hawaiian	" Santa Malta	
14. SS Indianan	" Willhilo	" West Islip
15. SS Iowan		
16. SS Isthmian	" Willkeno	" Eastern Light
17. SS Kansan	" Santa Olivia	
18. SS Kentuckian		
19. SS Louisianan	" Golden Harvest	" West Calera
20. SS Mexican		
21. SS Minnesotan		
22. MS Missourian		
23. SS Montanan	" Santa Paula	
24. SS Nebraskan	" Kermit	" Elsass
25. SS Nevadan	" Montpelier	" Bochum
26. SS Ohioan	" Willsolo	" Pawlet
27. SS Oklahoman	" Golden Fleece	" Dewey
28. SS Oregonian	" Santa Rosa	
29. SS Panaman		
30. SS Pennsylvanian		
31. SS Texan		
32. SS Virginian	" Maine	
33. SS Washingtonian	" Willzipo	" Eastern Mariner
34. SS Golden Dragon	" West Chopaka	
35. SS Golden Hind	" West Faralon	
36. SS Golden Horn	" Crisfield	
37. SS Gol. Mountain	" Bearport	
38. SS Golden Peak	" Crosskeys	
39. SS Golden Star	" Elkridge	
40. SS Golden Sun	" West Prospect	
41. SS Golden Tide	" Montague	

Stern of Diana Dollar, now Alabaman, showing Oertz rudder.

Port of Portland Notes

R. E. Borchgrevink.

● Port's Commerce Grows Despite Strike

Despite the maritime strike which halted all general cargo movement in and out of Portland during the last two months of 1936, the port's waterborne commerce last year was 155,912 tons greater than during the previous year of 1935.

While cargo tonnage represented a gain of 3.4 per cent, its value declined 2.2 per cent. Value of the 1936 commerce was placed at $233,825,720, compared with $239,193,498 in 1935.

The principal gain was in receipts of petroleum products from California, which bounded forward approximately 300,000 tons and accounted for most of the gain of $8,500,000 in value of coastwise inbound cargo. Petroleum products passing through this port, in fact, composed about 50 per cent of the tonnage and 25 per cent of the value of tonnage handled by the port. Oil tankers were the only vessels that continued to operate regularly during the strike period.

The only other trades that showed appreciable gains were inbound and outbound commerce between Portland and Gulf of Mexico ports.

● Steamship Men Name Trustees

Five new trustees were named to head the Portland Steamship Operators Association at their annual dinner meeting at the Benson Hotel, January 9. They were W. L. Williams, district manager for Hammond Shipping Company, retiring president; Albert Horn, Jr., division manager for General Petroleum Corporation, retiring secretary; A. J. Chalmers, president of Chalmers Shipping Company; L. J. Hoffman, district manager for Swayne & Hoyt, Ltd.; and A. B. Natland, district manager for Alexander & Baldwin, Ltd.

● R. E. Borchgrevink Resigns

R. E. Borchgrevink, manager of the Waterfront Employers of Portland since the close of the 1934 maritime strike, announced his resignation, effective March 1, at a special meeting of the Waterfront Employers' Association executive board. He did not disclose his future plans, but admitted that he had accepted a position with a leading steamship firm.

For 24 years Borchgrevink was associated with the operating and traffic departments of the Grace Line at San Francisco, Los Angeles and Seattle.

● Terminal Heads Named

Paul B. McKee, president of the Northwestern Electric Company, was revealed as the president of the Columbia Basin Terminals, Inc., which took a long-time lease on the former North Bend, ex-Admiral Line, terminal in Portland during December. He has as his chief associates David T. Honeyman, treasurer of Honeyman Hardware Company, and David B. Simpson, realtor, both of whom will serve as directors. Their secretary is John R. Latourette, attorney.

The terminal is to be reopened March 1 as a first-class general cargo terminal, having 400,000 square feet of storage space, two new, modern marine elevators for handling cargo from river boats and barges, and 1000 feet of riverfront berthing space. The principal tenant at first will be the newly organized Coastwise Line, which plans to load and dispatch a steamer each week at the terminal.

● Harbor Dredging Under Way

The Port of Portland dredge Clackamas was employed by the federal engineers to dredge an area 350 feet wide and 3500 feet long along the west side of the river front channel, just north of Broadway bridge, during December and January. Soil and sewage from the Tanner Creek sewer had shoaled to a depth of four to eight feet in this area.

● Famous Tug to be Dieselized

After operating for 47 years on the Columbia River as a steam tug, the ex-government engineers survey boat Geo. H. Mendell is to have a new 480 horsepower Atlas Imperial diesel motor installed in her this spring. Announcement of the plan to modernize her was made by Shaver Transportation Company, which purchased her for $3010 from the government last November.

The motor will be installed during March after the boat has been prepared for it at the Shaver moorage, just north of Oceanic terminals. The Mendell was built in Portland in 1889 and rebuilt in 1912. Her original steam engine is being removed to make way for the diesel. The tug will be used for towing log rafts and barges.

● Coastwise Ships Named

The six steel steamers purchased by the Coastwise Line to inaugurate its services between Portland, Seattle, and California ports were the Point Arena, Point Bonita, Point Gorda, Point Montara, Point Reyes, and Point Sur, according to Hector M. Hunt, president of the new concern. The vessels have been employed by Swayne & Hoyt in the Gulf Pacific Line service be-

tween North Pacific and Gulf ports, and were all idle in Gulf ports during the strike period. They are all of the same design and were built by the Submarine Boat Corporation, Newark, N. J., during the world war shipbuilding program of the U. S. Shipping Board Emergency Fleet Corporation.

● Diesel Tug Launched Here

The 57½-foot diesel all-welded steel tug Diamond Z-11, built for the National Paper Products Company, of Port Townsend, Washington, was launched in Portland January 2 by Commercial Iron Works, the builder. The vessel was said to be the largest all-welded tug constructed in the Pacific Northwest. She was powered with a 160-horsepower Atlas Imperial, has a semi-tunnel stern, and galley and sleeping quarters for a crew of two men. The boat was reported to have cost about $30,000.

● Terminal to be Rebuilt

Reconstruction of Portland's municipal terminal No. 1 is to be started by February 11, according to regulations of the Public Works Administration, which will supply 45 per cent of the funds necessary. Cost of the work was estimated as about $868,000. Bids were to be opened February 2 by the Portland Dock Commission.

The work will include widening of the quay along the face of Pier A to 30 feet to accommodate two railroad tracks; building a large open dock over the ex-American Can Company property adjoining the present terminal; widening of the main shed over Pier A; building of a large warehouse behind Pier A; reconstruction of the 60-foot apron facing the slip; and rearrangement of railroad tracks, ramps, and gear lockers.

● River Traffic Planned

Despite announcement by the United States Engineers that they will be forced to close Bonneville Dam to river boat passage for 11 months of 1937, at least two Columbia River operators have been making plans to continue the movement of petroleum products from Portland to The Dalles and points upstream during the year. They considered pumping oil and gasoline from boats and barges below the dam into other boats and barges above the dam through pipe lines the engineers said would be permitted.

Inland Navigation Company hurried construction of its diesel boat Inland Chief as fast as possible, with the hope that it might be run from Seattle to Portland, thence to the upper Columbia River before the dam was finally closed for the year.

Kirk Thompson, Spokane oil distributor, was reported planning to build four more barges and one more tug to move petroleum from Portland to Bonneville, where it would be pumped through the dam to his tug and barge above the dam.

● States Liner Last on Pacific

The States Line freighter Washington, of Portland, was the last Pacific Coast American steamer to operate on the Pacific Ocean during the maritime strike period. She arrived at San Francisco January 18 from Dairen and Vladivostok, four days after the Oceanic & Oriental steamer Golden Dragon, of San Francisco, arrived at Portland from the Philippines. Several East Coast American freighters were reported on the trade route between East Coast ports and Oriental ports.

Model of Terminal No. 1, Portland, as it will look when reconstruction is finished.

● Steamboat Veterans Plan Park

Upon being issued articles of incorporation as a non-profit-sharing corporation, the Veteran Steamboatmen of the West, Inc., are now planning to purchase 40 acres of land facing upon the Columbia River near Columbia City, Oregon, 45 miles below Portland, to establish a permanent park.

The plan is one proposed several years ago by Captain Arthur Riggs, master of the organization, and is now regarded as practically a certainty as the result of the favorable attitude of steamboat veterans, members of their families, and friends, expressed at a recent meeting in the Portland Public Library Building.

The organization, which is composed of veteran steamboatmen of the Columbia River district, Puget Sound, Grays Harbor, and even Sacramento River and San Francisco Bay area, their friends and descendants, owns a valuable collection of relics and pictures left from steamboating days, and proposes to house these in a permanent museum building to be erected in the park.

An open air auditorium, barbecue restaurant, and floats for berthing steamboats and pleasure craft are among improvements the veterans would erect if they make the purchase as planned.

● Port Commissioners Appointed

James H. Polhemus, for 17 years chief engineer and general manager of the Port of Portland, is now a member of the board for which he long labored. He and Edward Boyce, president of the Portland Hotel Company, were appointed port commissioners by Governor Charles H. Martin to succeed Harry M. Kenin and Paul C. Bates, whose terms expired January 11, 1937. Mr. Polheumus is now executive vice president of the Portland Electric Power Company.

D. O. Hood, Cameron Squires, and Drake C. O'Reilly were reappointed to the Commission. Each had been appointed previously by Governor Martin to fill out unexpired terms of former commissioners.

A completed installation of Case Weather Deck, showing fore and aft laying. Present method is to lay thwartship for greater facility.

Weather Deck Specialists

The superstructures which must be erected on the decks of seagoing vessels present many problems to the naval architect, the shipbuilder, and the ship operator. Not the least of the ship operator's problems is the maintenance of a water tight and non slip weather deck on these structures. These decks must be rigid and strong enough to maintain their form and integrity under very severe weaving and warping strains from the movements of the hull, and under heavy battering by the sea. Wooden decks covered by canvas, or steel decks covered with various compositions, must be constantly maintained by repairs and painting at considerable expense.

Some twelve years ago L. S. Case Inc., of San Francisco, proposed that these decks be covered with sheets of an elastic felted asphaltum of special composition, which would be cemented in place and would eliminate the necessity of caulking on wooden decks and of painting on steel decks. Tried out on several vessels, this material proved to have weather and wearing resistance qualities of such high order that no Case Weather Deck has ever needed replacement. Every deck laid by this firm has brought repeat orders. Guaranteed unconditionally for one year, these decks are maintained by Case service on a very reasonable basis without reference to time.

The success of Case Weather Decks led to an expansion of this firm's activities to take care of other deck-covering problems aboard ship, and so Case Tile and Case Magnesite were added to the line as ideal deckings for galleys, lavatories, bathrooms and similar spaces. Case Asphalt Emulsion was developed especially for covering steel decks in crews' quarters and other spaces requiring an elastic, waterproof, rust resistant decking that could not be marked by chair legs or other furniture. Case Mastex, another product of the L. S. Case research department, is peculiarly suited as an inside coating for ice boxes or refrigerated chambers on shipboard.

Two of the more recent products of this firm promise to be very useful aboard ship. The first of these is Case Non Slip Weather Decking, which is the standard Case Weather Decking with carborundum incorporated in its outer surface. This decking is now standard Case practice on all weather deck applications, and eliminates all danger of slipping on wet decks. This safety feature has a great appeal to all operators of ships.

The second recent product is Case Plastic Cork Insulation. This material, applied to the inside surfaces of a steel hull, insulates against heat or cold and eliminates ship sweat and rusting. Being applied in plastic form, it gives perfectly tight and complete coverage and prevents the harboring of vermin. Its adhesive power is exceptionally good, so that it adheres to the steel even on the sharply concave inner surfaces of a ship's stern and covers rivet heads and overlapping plate joints, presenting a hard smooth surface that may be painted with any color scheme desired.

The advantages claimed for the use of Case asphaltum products as weather deck and inner surface coverings on steel ships are:

1. They are rust resistant.

2. They are fire resistant. Red hot embers falling on these decks leave only a small scar.

3. Low maintenance costs. No painting is necessary except as desired for appearance.

4. Low repair costs. Any remodeling or repair work on the steel deck is easily recovered and the new decking forms a perfect bond with the original decking.

5. They maintain a hard surface under any weather temperatures encountered, either in the heat of the tropics or the cold of the Arctic Circle.

All Case products are manufactured by patented processes and are fully protected against infringement.

L. S. Case Inc. maintain their own offices, factory, and warehouse in San Francisco, and are prepared to service all shipping companies using this port, or to go to any other American port for the service of ships with their products.

Case Type R.H.S. on superstructure of S.S. Golden Dragon, showing severe conditions to which decks are subject.

Two Unusual New Steam Tugs

Tugs Carolyn and H. C. Jefferson First to be Equipped with Modern Unaflow Steam Engine Drive

By H. G. Mueller*

These two tugs were ordered by the Donaldson Towing & Lightering Company, of Philadelphia, the S.S. Carolyn, which was first to be placed in service, being chartered by the Curtis Bay Towing Company, of Baltimore, one of the largest towing contractors in that harbor, where she has been in continuous service since delivery. Both boats were built by The Pusey and Jones Corporation, of Wilmington, Delaware.

The second tug, the S.S. H. C. Jefferson, is a duplicate of the Carolyn, and is now completed and ready for delivery to the Donaldson Towing & Lightering Company, who will operate this tug in Philadelphia Harbor.

Both of these tugs embody many modern features, being the first of this type to use the unaflow engine for main propulsion, with superheated steam. They are designed with Maierform lines, and are equipped with Oertz streamlined rudders, and numerous other devices for improving their economy and practical performance in the general harbor service for which they will be used.

In contracting for these tugs the owners requested the shipbuilder to study the various types of propulsion available, including the conventional compound and triple-expansion steam engines, the unaflow engine, and direct-drive diesel engine; and after investigating the first costs, maneuverability, fuel costs, length of hull required for each type of plant, and other practical considerations, they selected the unaflow steam engine built by the Skinner Engine Company, Erie, Pennsylvania.

*Chief Engineer, Skinner Engine Company.

● The Propulsion Machinery.

This engine is a two-cylinder simple unaflow, shorter in overall length than the conventional triple, and saves approximately five feet in hull length, including the Scotch boiler chosen, over a direct-drive diesel unit. While the unaflow engine was higher in first cost than the triple or compound, its selection was found to be justified, as its extra cost would be more than offset by the saving in fuel.

Both cylinders are 25-inch bore by 20-inch stroke, each taking steam directly from a common manifold, thereby giving quick reversibility and instant response to the controls. The cranks are set at 90 degrees.

The steam pressure and superheat chosen are moderate and easily handled by any of the owner's crews, being 175 lb. pressure and 50 degrees to 100 degrees superheat. The condenser is designed to give 26 inches vacuum.

The engines are nominally rated at 600 i.h.p. with 130 r.p.m. at normal cut-offs. The characteristic of the unaflow is a short cut-off with very complete expansion of the steam, with resulting low steam rates. This feature also makes available large overload capacities at increased cut-offs, up to the capacity of the boiler. It was found on the trial runs that 750 i.h.p. could be readily obtained for fairly long periods without stressing the capacity of the boilers. For short periods, considerably more than this can be obtained.

Scotch boilers were chosen in the interest of giving the operating personnel simple and rugged equipment similar to that to which they were accustomed. These boilers are equipped with conventional burners using

Bunker C oil. Similar engines have been in successful service for a number of years at considerably higher pressures and temperatures generated by water tube boilers.

The superheaters are of the waste-heat type, mounted in the uptakes, designed to give a minimum superheat of 50 degrees under full load conditions, and approximately 100 degrees or 125 degrees under light load conditions.

● Lubrication System.

The engines are fully enclosed and force-feed lubricated. The crank case drains to a sump equipped with a float valve, and the oil is drawn from this sump by a small steam duplex pump and forced through an oil cooler and strainer to the main oil tank. A second pump picks the oil up from the tank and forces it under approximately 40 lb. pressure to all bearings of the engine. This oiling system lubricates every moving part of the engine. No oil cups or grease cups of any type are used.

The oil pumps, of which there are three, one being a spare, are compactly mounted on top of the oil tank, together with the cooler and the strainer, and this assembly is furnished as a complete unit for mounting in the tug.

The piston rods are equipped with oil wiper cases which keep out of the crank case any condensation from the cylinders and prevent leakage of oil. A single charge of oil will serve for many months in this closed system, without renewal. Occasional small quantities are added to keep the system full.

With superheated steam, cylinder lubrication is recommended, although it is possible, with the superheat limited to about 25 degrees, to operate these engines without cylinder oil. The builders, however, believe that with the efficient oil separating system provided it is better to use oil on the cylinders with or without superheat. Lubrication of cylinders improves the mechanical efficiency and greatly increases the life of the cylinders and piston rings, as compared with non lubricated operation.

Therefore, a force-feed cylinder oil pump is provided, driven from the engine, with sight feeds which can be adjusted to keep the cylinder oil used to a minimum. One feed is conducted to a point just ahead of each of the four poppet inlet valves, and two additional feeds are carried to the steam line at the throttle.

The oil removal equipment consists of a coagulating-type filter with a small two-feed pump driven from the engine for metering the coagulating chemicals. With this system the feed water can be readily sampled and kept clear of oil, at the same time permitting the obtaining of proper alkalinity for good boiler operation with a minimum of boiler water compounding. Also, oil can be used on the auxiliaries, greatly improving their life and performance.

● Controls.

The controls for the main engine are mounted on the upper deck and short-coupled direct to the cam box, from which the poppet inlet valves are operated eliminating the conventional steam jet commonly used on triple expansion engines.

The control is entirely by cut-off for stopping, starting, reversing, and running in either direction, one lever being provided for cut-off ahead, and one for cut-off astern. A third lever is provided for controlling the throttle valve.

With the cut-off control full steam pressure is obtained in the cylinders for all load conditions, thereby gaining nearly full expansion of the steam and eliminating the throttling condition used heretofore on reciprocating engines. With such characteristics, excellent economies are obtained over a wide range of speed and load conditions, which are highly desirable for a tug application.

This control gives exceedingly quick action and response, and the engine can be reversed, stopped, and started with the throttle wide open.

The experience with the Carolyn during the past two months in Baltimore Harbor has shown this to be a very desirable feature.

● Engine Detail Design.

The cylinders, cylinder heads, and pistons are cast from special alloyed semi steel, using nickel, chromium, and molybdenum. They are close grained, with a smooth-finish, hard cylinder wall surface, the life of which is far superior to conventional engine castings. The piston rings are of special alloys. Piston rings used on previous installations, with 300 lb. pressure and 200 degrees superheat, still show some of the original tool marks after three years of operation, covering approximately 280,000 miles.

The piston rod packings are of the full metallic type, using sectional bronze rings requiring no repacking or tightening up for long periods of operation.

The valve gear consists of an enclosed cam box containing the reversing mechanism, the cams and shafts, and tappets.

These tappets operate the double-beat steam tight expansion-compensating inlet valves, of patented design, with flat seats which are ground in cold and need no further attention.

With the design of valve gear employed (patented), a perfect neutral is obtained, and the indicator cards are well balanced from a "shoestring" friction load condition to large overload conditions.

The bored guides of the self aligning type are another patented feature. Connecting rod and connecting rod bolts, crossheads, piston rods, and other stress-taking parts, are made of heat-treated alloy steels of high tensile strength and high ductility.

A single piece forging made to American Bureau of Shipping Grade Two specification, the crankshaft is fully counterbalanced, giving smooth performance, free from vibration at speeds considerably in excess of normal.

Overall dimensions of these engines are approximately 6 feet 6 inches width of base, 9 feet length, and 13 feet 5 inches from the center of the shaft over the top. These compact dimensions give ample space in the engine room for mounting all auxiliaries with more than usual accessibility, leaving ample room to insure safe working conditions for the operating crew.

Marine Insurance Review

The Lutine Bell at Lloyd's

The Story of the World's Most Celebrated Relic of Marine Underwriting History

Perhaps the most celebrated of all the relics of marine disasters is the Lutine Bell, which hangs enshrined in a classic temple at the center of Lloyd's Underwriters' Room, London, as shown in our illustration. This bell is tolled upon the receipt of reliable information of total losses of ships at sea. The story of the Lutine appears as follows in a recent issue of the Fireman's Fund Record:

"In 1799 the British frigate Lutine sailed out of Yarmouth Roads on her voyage to Hamburg. A terrific gale came up in the night and she was wrecked on the treacherous shoals at the entrance to the Zuyder Zee. Her bullion and specie were valued at $7,000,000. All hands but one went down with her.

"Lloyd's had insured the treasure on board for $4,500,000, and in return for their payment of this amount the underwriters became possessed of the right to recover the treasure. The government of Holland, however, made its position clear by claiming the wreck and everything in it. After the Netherlands government had recovered about $280,000 Lloyd's induced the British government to deal with Holland to get them to relinquish their title to the wreck, and after many years the legal title passed to Lloyd's.

The Lutine bell as enshrined at Lloyd's Underwriting Room, London.

"For over half a century the Lutine lay on the shifting sand bank, completely covered by sand. Then a terrific gale blew for days, and the violent movement of water washed the sand away so that salvors could reach the wreck. In the intervening years many salvage attempts have been undertaken, and in 1935 special equipment designed to meet the peculiar difficulties of the location was completed. It is said, however, that not more than $500,000 has been recovered so far.

"Various relics of the ship have been brought up and are to be found at Lloyd's, in London, where the Lutine bell hangs in the center of the underwriting room."

Backing Power and Retardation of Ships

In the investigation of collisions between ships, it is nearly always of importance to determine how quickly a vessel can be brought to a standstill from full speed ahead, and how far she travels from the moment at which the engines are reversed before ahead motion ceases.

The time occupied in the above maneuver is always determined for naval vessels and quite frequently for merchant ships, but there is available but little information as to the distance traveled before the ship is at rest, and this is of the utmost importance in determining the relative positions and courses of two colliding vessels before the collision occurred.

Of almost equal importance is the determination of rate of retardation and distance traveled to stopping when the engines are reversed with the ship running at less than full speed. For anything approaching accuracy in this case, a retardation curve is necessary, or

at least records of the time required to stop when running at reduced speed. Of data of this sort, there appears to be next to nothing extant.

A further matter of importance in the investigation of collisions is the rate of retardation of a ship due to the drag of her propellers. In other words, if the engines are stopped, say at a speed of 15 knots, how far will the ship have traveled in any given time after stopping, and at what rate will she still be moving at the expiration of that time? For actual ships there is very little definite information available, but certain model experiments indicate that the drag of locked propellers is a most effective brake and may amount to more than 50 per cent of the resistance of the bare hull.

The Bureau is making a study of these various matters, and in this connection would very greatly appreciate the cooperation of shipbuilders and ship operators. Any data which they may have, bearing upon the retardation or stopping of ships of any type or size, would certainly be of interest, and, if accompanied by sufficient supporting data as to displacement, power, and propeller characteristics, would materially aid in this investigation.

[Bulletin of Bureau of Marine Inspection and Navigation, Department of Commerce, Washington, D.C.]

Loss of Steamer Bessemer City

A very interesting first hand account of the loss, on November 1, 1936, of the American freighter Bessemer City appeared in Fireman's Fund Record for December, 1936. This story of the wreck was quoted verbatim from a letter by Bruce Selfridge, 18 year old son of John S. Selfridge, of the Securities Department of the Fireman's Fund Insurance Company at San Francisco, who had signed on this vessel as one of the crew.

Sailing from San Francisco on September 21 with a crew of 33 and a cargo of California dried fruit and other merchandise, including quite a quantity of lumber carried partly as a deck load, the Bessemer City arrived in Liverpool on October 26 after an extremely rough voyage.

Continuing her way from Liverpool to London the vessel foundered on the rocky coast of Cornwall on the morning of November 1.

Bruce Selfridge wrote of his experiences before reaching Liverpool: "The sea was coming from the after port quarter, and the ship was awash about eight hours. Over here they call it a gale; in the United States a hurricane... The waves were breaking over the boat-deck continuously. They would tower over the ship like huge cliffs. Sometimes we would slide out from under them, sometimes we didn't . . . The packet would roll way over till you thought she was going on over, then back she would come, and a big one would catch her by the stern and broach her into the next sea. When that happens the old tub looks like a submarine. When she would rise up the water would pour off. About a half hour before I went off lookout, she took a green one clear over the top of the wheel house. I was standing in water on the bridge, over my knees. When that wave hit it felt like a ton of bricks. The deck-load of lumber was shifted over about two feet . . . Some fun; I loved it."

After the stranding he wrote: "I was on lookout about ten minutes before she struck—that was at nine thirty. We were there about two hours when the water reached the boilers; they blew up and split us in half. The Coast Guard boat came out a little later and took off half the crew. I stayed on. She started breaking then; we loaded all the gear in a lifeboat. About 4:30 a.m. the lifeboat returned. We were in a bad state then. The rest of us left except the Old Man and a couple of the officers. We were taken care of at the Salvation Army until seven, when the rest came off. They said she had parted completely then. One part went one way and one the other . . . I saved my good suit and coat, but lost all my work clothes. We were a pretty tough looking bunch."

With the vessel smashed in two amidships, both parts resting on a rocky bottom, the constant pounding of very heavy seas completely wrecked the after part of the ship. Salvage operations were undertaken in the hope that some of the machinery and cargo in the forward part of the wreck might be saved. However, the outlook is not very bright because of the very exposed position of the wreck.

Swiftsure Rides a Gale off Flattery

(From the Sea Letter for October 1936, of the American Merchant Marine Library Association, New York City.)

Lightship crews are unsung heroes of the deep. Their duty is to warn vessels away from danger before disaster occurs, and in the performance of this they ride at anchor, isolated from the world of men. It means countless monotonous hours month after month and year after year. In great storms they do not flee to port with other vessels of their size, but stay on the job, buffeted and tossed by angry seas.

The Sea Letter is indebted for the story of such a storm to Captain Eric H. Lindman, of the United States light vessel Swiftsure, anchored at the Juan de Fuca Strait, off the Coast of Washington.

"The signs indicated trouble; one could almost smell it," he wrote. "At noon the glass had fallen to 29.66 inches, and the temperature had dropped to 38 degrees Fahrenheit. Ports and other possible openings were closed and battened down as the boat began to pitch and wallow.

"When the watch went on at 8 p.m. the glass was 29.04 inches. The wind began a steady whistle through the shrouds and ratlines. It was blowing close to 60 miles an hour. Seas 30 feet high plunged into and over the bow..

"By midnight the barometric pressure was 28.80 inches. The wind came shrieking and snarling up out of the south at times more than 100 miles an hour. She was blowing a hurricane.

"The noise of the wind and the sea at such a time beggars description. The water writhed and steamed like a bowl of boiling milk. The air was full of innumerable tiny particles of water torn from the crests of the waves until the air was so thick we could barely see half the length of our vessel.

"The foghorn was blowing, but one could scarcely hear it. Screaming fiends seemed to be racing along the outer deck. To add to the pandemonium, objects broken loose by the wild corkscrew wallowings of the vessel set up an unearthly clatter as they raced about in the alleys and on the decks below.

"Soon the waves broke over the pilot house. The water would force itself into the ship through every fissure, no matter how small, even squirting in through the keyholes of the outer cabin doors in the pilot house. It was impossible to sleep, and the sailors welcomed the order to 'turn to' and make all articles fast. It was somthing to take their minds off the storm.

"The storm receded as rapidly as it came up. By 1 a.m. things began to taper off. By dawn it was almost calm. It was Christmas morning."

—U.S. Lighthouse Service Bulletin.

Certificates and Discharge Books

(Continued from Page 25)

of the issuing port, date of issue, and other pertinent information required to be shown on the certificate, including the proper discharge book number, shall be properly entered.

(e) Any applicant for a certificate of service or of efficiency who has been duly examined and refused by a board of local inspectors will not be permitted to make application for reexamination until 30 days have elapsed.

(f) A certificate of service or of efficiency is subject to suspension or revocation if the holder thereof is found guilty of any act of incompetency or misconduct or any act in violation of the provisions of Title 52 of the Revised Statutes or of any of the regulations issued thereunder. Such suspension or revocation shall be in accordance with the provisions of 4450 R. S., as amended.

(g) If an applicant has had a certificate revoked and if seeking a new one, the local inspectors shall, before issuing a new certificate, forward to the Bureau a full report with reference thereto.

(h) Any person whose certificate of service or of efficiency has been stolen, lost, or destroyed, shall report that fact to a board of local inspectors as soon as possible, and if a duplicate certificate is desired, shall make affidavit in duplicate on Form 719-e, furnishing the same number of photographs as provided for in the case of an application for an original certificate. The board of local inspectors shall forthwith transmit the original copy of the affidavit and two photographs to the Director of the Bureau of Marine Inspection and Navigation, who shall thereupon cause to be prepared a certificate which shall be similar to the former certificate, bear the same book number as the former certificate, and be marked "duplicate." The certificate shall then be forwarded to the proper board of local inspectors, who shall issue the duplicate certificate in the same manner as an original.

(i) Whenever a certificate of service or of efficiency is reported to a board of local inspectors as having been stolen, lost, or destroyed, the local inspectors shall immediately report the fact by letter to the Director of the Bureau of Marine Inspection and Navigation, giving all the facts incident to its loss or destruction. By the same procedure, they shall report the recovery of any certificate of service or of efficiency together with all facts incident to its recovery, and shall forward the recovered certificate to the Director of the Bureau of Marine Inspection and Navigation. The Bulletin published monthly by the Bureau shall contain information of reported loss, theft, revocation, or suspension of certificates.

● Sec. 8. Discharge of Seamen

(a) Upon the discharge of any seaman and payment of his wages, the shipping commissioner, or collector or deputy collector of customs, at ports where no shipping commissioner has been appointed, shall enter in the continuous discharge book the name, class, and official number of the vessel; the nature of the voyage; the date and place of shipment and of discharge of such seaman; and the rating then held by the seaman. Whenever a seaman is discharged in any collection district, where no shipping commissioner has been appointed, or other officer designated to act as such, the master of the vessel shall perform the duties of the shipping commissioner and shall make the proper entries in the continuous discharge book. In cases where the law does not require the seaman to be shipped and discharged before a shipping commissioner, the master of the vessel shall make the required entries in the continuous discharge book. All entries shall be made in black ink.

(b) Upon the discharge of any seaman in a foreign port the master shall make the proper entries in the continuous discharge book and on the ship's articles, and such entries shall be attested to by the consular officer. If the seaman has lost his continuous discharge book the master shall furnish him with a temporary certificate of discharge (Form 719-A), attested to by the consular officer and note this fact on the articles.

(c) If a seaman loses his continuous discharge book by shipwreck or other casualty, he will be furnished with a duplicate book free of charge upon application to a shipping commissioner or collector or deputy collector of customs at ports where no shipping commissioner has been appointed. In other cases of loss, a charge shall be made for a duplicate book in an amount equivalent to the cost thereof.

(d) The application for such duplicate book shall be made in the form of an affidavit on Form 719-e and three (3) photographs furnished. The shipping commissioner, or collector or deputy collector of customs, shall transmit the original copy of the affidavit and two (2) photographs to the Director of the Bureau of Marine Inspection and Navigation who shall thereupon cause to be prepared a continuous discharge book, bearing the same number as the former book, and marked "duplicate." The book shall then be forwarded to the proper shipping commissioner or collector or deputy collector of customs, who shall issue the duplicate book in the same manner as an original.

(e) Whenever a continuous discharge book is reported to a shipping commissioner or collector of customs as having been stolen, lost, or destroyed, the shipping commissioner or collector of customs shall immediately report the fact by letter to the Director of the Bureau of Marine Inspection and Navigation, giving all the facts incident to its loss or destruction. By the same procedure, he shall report the recovery of a continuous discharge book with all the facts incident to its recovery, and shall forward the recovered book to the Director of the Bureau of Marine Inspection and Navigation.

(f) Pending the issuance of a duplicate book, the shipping commissioner, or collector or deputy collector of customs, at ports where no shipping commissioner

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On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

New Shipbuilding Activities

As reported in our January issue, the Standard Oil Company of California has contracted with the Sun Shipbuilding and Dry Dock Company for two new tankers of 12,800 ton deadweight carrying capacity, to be powered with Westinghouse 3,500 horsepower turbines taking steam from Babcock and Wilcox boilers, and to have a loaded trial speed of 13 knots. These vessels are now under construction at Chester, Pennsylvania, and in the near future Pacific Marine Review will be publishing full details, drawings, and pictures.

The Standard Oil Company of New Jersey has placed orders for two 13,000 deadweight ton steam turbine driven tankers to be built at the Sparrows Point plant of the Bethlehem Shipbuilding Corporation. These ships will be 442 feet long, 64 feet beam, and 34 feet 10 inches deep, and will have a gross tonnage of 7,600 tons and speed of 12 knots. The cost of the two ships will be $4,000,000.

The United States Lines has applied to the United States Maritime Commission for shipbuilding and operating subsidies, on two proposals for a new passenger liner to run in service with the S.S. Manhattan and S.S. Washington. One of these proposals is for a sister ship to the two liners now in the service, with a few minor changes in the passenger accommodations. The other is for a larger ship of the same class as the other two. Both proposals include all the latest safety and national defense features. The technical staffs of the Maritime Commission and of the Navy Department are studying these proposals and are preparing specifications preparatory to advertisement for bids. Only one vessel is to be built, but it is understood that the Commission will call for bids on each ship and make final decision after it has carefully examined all bids.

Reports from Washington, D.C., indicate that the U.S. Maritime Commission is making a careful study of an emergency shipbuilding program, which may at any time be initiated by the President's order under Title VII of the Merchant Marine Act of 1936. The proposal uppermost in the thought of the Commission at present is the construction of 40 fast cargo vessels, with an aggregate deadweight capacity of 360,000 tons, speeds of 16 to 20 knots, and an estimated cost of $60,000,000.

Four classes of vessels are contemplated:

1. 10,000 ton deadweight carrying capacity, 18 knot service speed, 20 knot top speed. Ten ships.
2. 8,000 ton deadweight of same speed conditions as (1). Ten ships.
3. 10,000 ton deadweight carrying capacity, 16 knot service speed, 18 knot top speed. Ten ships.
4. 8,000 ton deadweight, of same speed conditions as (3). Ten ships.

These ships to be the beginning of a long range construction program as authorized by the Merchant Marine Act.

Naval Architects Busy

On the drafting boards of the naval architects of the United States are a number of construction projects from coast to coast, which, however, since the enactment of the Merchant Marine Act of 1936, must await consideration by the Maritime Commission. Some of these proposals are as follows:

One or two passenger-cargo steamers; American South African Line, New York City; bids received but later rejected.

Three 18-knot cargo liners, 485 feet long, 14,000 ton displacement; Black Diamond Steamship Corp., New York City; planned.

Six 18-knot freighters, Calmar Steamship Corp., New York City; plans being prepared.

Two steamships, Chesapeake Steamship Corp., Baltimore, Maryland; planned.

Several bulk freighters, International Harvester Co. and Inland Steel Co., Chicago, Illinois; plans to be completed soon.

Four cargo vessels of about 10,000 tons each; Isthmian Steamship Co., New York City.

Two large cargo vessels, Matson Navigation Co., San Francisco, California; bids received, prices too high, plans being reviewed.

Two passenger-cargo ships designed by V. M. Friede, Missisippi Shipping Co., New Orleans, Louisiana.

Two ships for carriage of passengers and cargo, Ocean Steamship Co. of Savannah, New York City; plans being prepared by George G. Sharp, New York.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date 9/-19/37. **Hull 5356—Maury (DD401);** completion date 12/19/37; two 1500-ton destroyers for U. S. Navy; length, 341' 3¾"; beam, 35' 6⅛"; depth, 19' 8". Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; completion date, April 2, 1937.

THE CAMPBELL MACHINE COMPANY
Foot of Eighth Street
San Diego, California

NEW CONSTRUCTION:

Hull 53, Victoria, tuna clipper; Matthew C. Monise, owner. Length 135', main engine 600 h.p. 6 cylinder Union diesel. Launching date, November 1, 1936; completion date, March 1, 1937.

Hull 54, Triunfo, tuna clipper; Joaquin Canas & Co., owners. Length 125', main engine 450 h.p. 6 cylinder Union diesel. Launching date, November 10, 1936; completion date, March 1, 1937.

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION: **4 keels laid** July 6, 1936, Fellows Craft stock cruisers 40' x 8' x 2'6", powered with Kermath Sea Flyer 6-cylinder 85-H.P. engines with 2 to 1 reduction gears.

One 45 ft. ferry service boat powered with twin 110 H.P. Buda diesels.

Five 32 ft. W.L., 46 ft. O.L. One design sloop yachts, keels to be laid in the immediate future.

Auxiliary power, with small h. p.

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Barge No. 52, Midway, Gas. S. Northern Queen.**

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats;** 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laids September, 1936; estimated launching, March, 1937; expected completion, July, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: **Golden Cloud, Nailseacourt, Utacarbon.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: **Olympic, M.S. Seatac, Yacht Aquillo.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **W. P. Barge No. 3, Santa Fe Barge No. 8, Folderol, Santa Fe Barge No. 7, Water Barge YW30, Elizabeth, Seattle, Esther Johnson, Brunswick, Dorothy Wintermote, Patterson, American Star, Frances, Ariadne, Clipper, Vagabond.**

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: **1 scow; 6 fish boats; 11 ship repair jobs not requiring docking; 24 commercial jobs.**

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 23, 1935; **estimated completion date, February 1, 1937;** estimated delivery, September 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935, estimated completion date, May 1, 1937; estimated delivery, October 1, 1937.

Construction of **Destroyer No. 408, U.S.S. Wilson,** 1500 tons, keel not yet laid.

DRYDOCK AND ROUTINE REPAIRS: **Texas, Idaho, Mississippi, Salt Lake City, Lexington, Malopac.**

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Keel laying begun for ten 30' and ten 20' stock keels.

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley,** Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); estimated delivery August, 1937; keel laid January 14, 1936; to be launched early in 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; launching date not set; completion date June 1, 1938.

DRYDOCK AND ROUTINE REPAIRS: **Bainbridge, Reuben James, Sturtevant, Goff, Tuscaloosa, Memphis, Relief, Langley, Kalmia, Bass, Nautilus, Melville, Henderson.**

WESTERN BOAT BUILDING CO.
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 120, purse seine fishing boat; 87 feet long, 23 feet beam; 170 H. P. Atlas Imperial engine. Keel laid September 15, 1936; launching date, December 10, 1936; **estimated completion date, February 1, 1937.** Owner, Paul Sleipnes and associates, San Francisco.

Hull No. 121, purse seine fishing boat; length 75 feet, beam 19 feet; 135 H. P. Atlas engine Keel laid November 15, 1936; launching date, January 15, 1937; **to be completed by February 25, 1937.** Owner, Paul and Vincent Martinis, Everett, Wash.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION: **4 dump scows** 114'x26'x7'9"; **14 coal barges** 175'x26'x11'.

DRYDOCK AND ROUTINE REPAIRS: **10 coal barges, new sides and knuckles.**

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Hull No. 915, Four yard dipper dredge**; length overall 110'; breadth molded, 40'; depth molded, 8'; steel house 84'x24'x 10'3" high; no living quarters. Designed for maximum bridge clearance of 15', which requires a frame and stack to be collapsible. Scotch boiler 13' diameter by 12'10" long; 160 lbs. pressure. To be built at Buffalo. Keel laid December 20, 1936; estimated launching date, March 1, 1937; delivery date, April 15, 1937.

DRYDOCK AND ROUTINE REPAIRS: **J. P. Morgan, Wm. E. Corey, H. C. Frick, C. S. Robinson, Joseph Sellwood, J. S. Ashley, E. T. Weir, H. R. Jones.**

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis and DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively. **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hull No. 167, Ferryboat **Aquidneck.** Diesel electric ferry for U.S. Navy; estimated delivery, March, 1937.

Hull No. 169, Trawler, single screw, diesel propelled, for delivery to Boston, Mass., owners in April, 1937.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 172, "J" class sloop for Mr. Harold S. Vanderbilt; delivery spring, 1937.

Hull No. 173, Winchester, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, May 15, 1937.

Hull No. 174, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, June 1, 1937.

Hull No. 175, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 176, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION: **Heavy Cruiser CA44, Vincennes**, 10,000 tons. Keel laid January 2, 1934; launched May 21, 1936; estimated delivery, January 1937.

DD-380, Gridley, 1500 Ton Destroyer. Keel laid June 3, 1935; launched December 1, 1936; estimated delivery, March, 1937.

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; estimated launching, March, 1937; estimated delivery, June, 1937.

CV7, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; estimated delivery February 1, 1938.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil Tankers**—steam—425'x64'x34' for Gulf Refining Co.; total tonnage 7070 each.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel towboats** of 450 H. P. each, for private parties. Delivery dates May 1, 1937, and June 1, 1937.

One 90' all-welded diesel towboat of 750 H.P., for private parties. Launched December 18, 1936; delivery date, February 15, 1937.

One 90' all-welded diesel tug for the Red Star Towing Co.; delivery date, May 1, 1937.

DRYDOCK AND ROUTINE REPAIRS: Five diesel tugs; conversion of two sand scows to carry coal; various tugs and barges.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Furnishing hoppers and cars for Etiwan Fertilizer Company.**

DRYDOCK AND ROUTINE REPAIRS: **U.S.L.H. tender Palmetto, yacht Peg-N'-Doby, yacht Berto, yacht Mary Otis, U.S. Quartermaster steamer Sprigg Carroll.**

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

NEW CONSTRUCTION: **65-footer** for E. E. Dickinson, powered with 2 Speedways, **42-footer** for A. P. Green, powered with 2 110-H.P. Kermaths.

Four 39-foot "play boats" for stock.

34-foot Florida guide-boat, powered with 2 Grays.

42-foot Florida guide-boat, powered with 2 Grays.

42-foot boat powered with 2 Speedways.

73-foot boat powered with 2 Speedways.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION: **One 175'x34' x10' tender** for U.S. Lighthouse Dept. Two triple expansion steam engines; total horsepower 1000; keel laid July 1, 1936; estimated delivery, February 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997**, one diesel sternwheel towboat of 91 gross tons.

Hulls Nos. 1298-1299, inclusive; two self-propelled diesel pipe line dredges, Thompson and Rock Island, for U.S. Engineers, St. Paul; 3974 gross tons.

Hulls Nos. 1324-1327, inclusive; four welded flush deck cargo box barges 100' x 26' x 6'6"; 660 gross tons.

Hulls Nos. 1347-1351, inclusive; five welded type W-3 coal barges 175' x 26" x10'8"; 2360 gross tons.

Hulls Nos. 1352-1361, inclusive: ten welded type W-3 coal barges 175' x 26' x 10'8"; 4720 gross tons.

Hulls Nos. 1362-1368, inclusive; seven welded steel oil barges 175' x 26' x 10'8"; 3304 gross tons.

Hulls Nos. 1369-1374, inclusive; six welded flush deck cargo box barges 130' x 34' x 10', for Warner Equipment Co., Philadelphia, Penn.; 2712 gross tons.

Hulls Nos. 1375-1378, inclusive; four welded steel deck barges 80' x 30' x 9', for Pennsylvania Railroad, Phildelphia, Penn.; 708 gross tons.

This makes a total of 39 hulls with a total gross tonnage of 18,529 tons.

ELECTRIC BOAT CO.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 24, Pickerel, S.S. 177 keel laid March 25, 1935; launched July 7, 1936; estimated completion date, January, 1938.

Hull No. 25, Permit, S.S. 178, keel laid June 6, 1936; launched October 5, 1936; delivery date, March, 1938.

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936.

Hull No. 28, Skipjack, SS184, stand ard displacement, 1450 tons; keel laid July 22, 1936.

Hull No. 29, Sargo, S.S. 188
Hull No. 30, Saury, S.S. 189
Hull No. 31, Spearfish, S.S. 190.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, **DD381 Somers** and **DD383 Warrington**; keels laid June 27, 1935 and October 10, 1935, respectively; estimated launching, February, 1937, and March, 1937, respectively; estimated completion March 1, 1937.

Three destroyers, **DD397 Benham, DD398 Ellet** and **DD399 Lang**, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936 and DD398, December 3, 1936.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing; keel

laid. Hull 143, December 16, 1936.

Two destroyers, DD411 and DD412.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION: Two barges, 152'x30'x7'9", for carrying petroleum products in six tanks in hull or for heavy deck loading; to be built at Chickasaw (Mobile), Alabama, yard. Estimated launching date, February, 1937.

Six 1000-ton all welded steel deck barges for sand and gravel movements; length 130', breadth 34', depth 10'. To be built at Chickasaw (Mobile), Alabama, for Warner Company, Philadelphia. Delivery of three March 15, 1937; second three, April 15, 1937.

JAKOBSON & PETERSON, INC.
Ft. of 10th Avenue
Brooklyn, New York

NEW CONSTRUCTION: One 65' all welded steel combination tow boat and tanker for the Lewis Coal & Oil Corp. of Port Washington, N.Y. To be powered with 300-H.P. Atlas Imperial diesel engine. Launching date, November 18, 1936; completion date, February 1, 1937.

Hull No. 263, one oil barge for Lewis Transportation Co.; 110'x24'x10'6"; all welded steel; launched January 27, 1937; completion date, February 2, 1937.

DRYDOCK AND ROUTINE REPAIRS: Reconditioning and conversion of full rigged ship **Joseph Conrad** into a yacht. Installation of 160 H.P. Atlas diesel; two 10 K.W. Atlas diesel generating sets, etc.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION: **One full model hull, all-welded diesel tug, 55' long, 14' beam, 7'6" deep;** 120-horsepower Fairbanks-Morse marine diesel engine; for Atlantic, Gulf & Pacific Co., New York City.

One all-welded, steel derrick barge 50' x 28' x 5'3", for Austin Bridge Co., Dallas, Texas.

One all-welded, steel ferryboat, length overall, 149', beam over guards, 66', beam molded, 54', depth molded, 11'. Twin screw diesel electric. Two 350-horsepower Cooper-Bessemer diesel engines with Westinghouse generators and motors. For Algiers Public Service Corp., New Orleans, Louisiana. Delivery date, February, 1937.

MANITOWOC SHIPBUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank** steamer, 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated launching date, July 15, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION: **Opon, sternwheel river steamer,** 200' x 44' x 5'6"; keel laid November 6, 1936; launching date, February, 1937.

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. Keel laying date, December, 1936.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **Five steel carfloats,** 250'x34'x9', for the Pennsylvania Railroad, to be delivered in April, May and June, 1937.

One steel, double ended diesel-electric ferryboat for Norfolk, Va. Probable delivery, February, 1937.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION: Contract for Hull No. 411, Winslow (DD359), destroyer, launched September 21, 1936;

of 1850 tons.

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: H 359 air craft carrier CV5, Yorktown, for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6".

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launching date, August 1, 1937; delivery date, September, 1937.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

NEW CONSTRUCTION: One 60-foot iron hull, all-welded V bottom boarding and fumigating vessel for U. S. Public Health Service; equipped with twin screw Superior diesel engines. Keel laid November, 1936; launching date, February 1, 1937; delivery date, March 23, 1937.

SUN SHIPBUILDING AND DRYDOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 158, one single screw bulk oil tanker for the Socony Vacuum Oil Co. 485'6"x68'0"x37'0"; 15,000 tons deadweight; one 4000 S.H.P. cross compound double reduction geared turbine unit; three watertube boilers. Keel laying May 8, 1936; launched January, 1937; delivery February, 1937.

Hull No. 159, 1 oil tanker (diesel), 511'x65'9"x37'; 15,800 tons; launching date, February, 1937; delivery date, March 1, 1937.

Hull No. 160, 1 oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, steam tankers for Standard Oil Company of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, August, 1937; delivery date, September, 1937. No. 162, launching date, January, 1938; delivery date, February, 1938.

Hulls No. 163 and 164, diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launching date, July, 1937; delivery date, August, 1937. No. 164, keel laid December 15, 1936; launching date, January, 1938; delivery date, February, 1938.

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION: 24 pontoons 48' x 16' x 2'6" for U.S. Engineer, St. Paul, Minn.

Two dump scows for U. S. Engineer, Cincinnati, Ohio.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD384, U.S.S. Dunlap, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched April 18, 1936; estimated delivery, April 9, 1937.

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, June 9, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching March 18, April 8, and April 29, 1937, respectively; estimated delivery May 19, June 9, and June 30, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250', Beam 43'6", Depth 16'. Estimated keel laying, April 27, May 11, and June 8, 1937, respectively; estimated launching, August 17, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION: Destroyer DD370, Case, L.B.P. 334'; beam 35'; depth 19'8"; keel laid, Sept. 19, 1934; launched Sept. 14, 1935; commissioned September 15, 1936; estimated delivery, February, 1937.

Destroyer DD371, Conyngham, L.B.P. 334'; beam 35'; keel laid Sept. 19, 1934; launched Sept. 14, 1935; commissioned Nov. 4, 1936; estimated delivery, February, 1937.

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, June, 1937 and July, 1937, respectively.

(Continued on Page 54)

Observations *From The* Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Calendar for You!

This year's calendar from Columbian Rope Company is up to its usual standard—one of the most attractive we receive each year. The subject for 1937 is "The Passagemakers," presenting another strikingly beautiful creation of Charles Robert Patterson. It depicts two sailing ships, one

a Gloucester fisherman, the other a deep-water sailing ship, hurrying to reach port before darkness falls. Both carry a press of canvas, and both are trying to make a passage—the fisherman with a full fare of fish for market, the square rigger anxious to make land after a trip half way round the world. It is one of the most beautiful calendars we have seen.

Readers of P.M.R. may receive copies by addressing Auburn headquarters, mentioning your favorite marine magazine.

New Todd President

Fred D. Hesley was recently elected president of the Todd Galveston

COMPLETES TWENTY YEARS OF SERVICE

William M. McLean, purser of the Grace liner Santa Paula, starts out on his second score of years at sea and the last half of his second million miles with the sailing of the Santa Paula Saturday, January 9th. During his twenty years of service with the Grace Line Mr. McLean has "sailed" one and a half million miles, enough miles to take him 60 times around the world or 7 times to the moon.

Dry Docks, Inc., to succeed John D. Reilly, who was elected chairman of the board.

Todd Galveston plant is a subsidiary of Todd Shipyards Corporation, of which John D. Reilly is president. Mr. Hesley has been vice-president in Galveston since the organization of the plant in 1934. Previously he was first vice-president of the Todd plant in New Orleans, to which he was appointed in 1927 after resigning from the U.S. Shipping Board.

Other officers of the Galveston subsidiary are: George Dawe, president of the Robins Dry Dock and Repair Company, vice-president; and J. Herbert Todd, vice president and chairman of the executive committee of Todd Shipyards Corporation, vice-president.

At a meeting of the advisory board of the Todd Shipyards Corporation recently, the following new members were elected: James G. Broderick, E. P. Enfer, and C. H. M. Jones.

Capt. William Carley.

Captain William Carley, who was general superintendent of the Panama Pacific Line on the Pacific Coast for the past few months, has been recalled to New York, **Captain Theodore Van Beek** having been appointed acting general superintendent. The latter is a veteran commander, and will be remembered as having put in at Pacific Coast ports several times during the past three years, in the capacity of relief captain. Captain Van Beek will have his headquarters at Pier 35, in San Francisco.

Propeller Club of California Mourns Capt. F. M. Edwards, President Elect

On the eve of going to press we have received the sorrowing news of the passing of Captain Francis M. Edwards.

At the recent annual meeting of the Propeller Club Captain Edwards was unanimously chosen to the highest honor his loyal friends of the organization could bestow.

His passing ends the career of a man loved by so many for his rich qualities of real friendship and unswerving fidelity to his principles.

Captain Edwards belonged to the sea. For thirty years he was in the service of the Matson Line . . . one of the highly-respected ship masters of the glorious days of trade pioneering on the Pacific. When he left the sea it was to become the assistant operations manager of the company at San Francisco. Upon his retirement in September of last year, he was named president of the State Pilot Commission.

Every member of the Propeller Club will miss his companionship, his warm hand clasp, his ready smile. Our friend has made the inevitable voyage, "Life's greatest experience."

"Twilight and evening star
And one clear call for me
And may there be no moaning from the bar
When I put out to sea."

● Report of Meeting

At the annual business and election meeting of the Club, held January 12, the unanimous ballot of the membership for the 1937 presidency was cast for Captain Francis M. Edwards.

Captain Edwards has been an untiring worker for the Club. He was elevated to the post of Chairman of the Board of Governors in January, 1935, serving in that capacity during the administration of ex-president Charles H. Robertson.

Edward H. Harms was elected to the newly-created office of vice-president.

New members of the Board of Governers are: George A. Armes, Walter J. Walsh, Erik Krag, and Harold Weule. These four directors take over the duties of retiring governors John Greany, Fletcher Monson, C. M. Le Count, and W. Edgar Martin. Incumbent members of the governing board are: H. H. Brann, Joseph J. Coney, Philip Coxon, Bernard de Rochie, L. M. Edelman, George Swett, and Charles E. Finney.

Our retiring president, Joseph J. Geary, took the occasion to thank all committees and their personnel, the officers and directors of the Club, and the membership in general, for fine support extended to his administration.

Junior past-president Joe has been a good helmsman, and the Club is indebted to him for his conscientious, well-balanced leadership. Voyage 1936 has definitely been a milestone in the Club's progressive career. Thanks, Joe—a lot!

● Program Scores

Newly elected vice-president Edward H. Harms took over the gavel to conduct the program feature of the January 12 luncheon meeting. Mr. Harms officiated in the absence of president-elect Captain Edwards, who has been in the sick bay.

Followed the introduction of Chairman of the Day Ray Ingram, of Union Oil Company's marine department in San Francisco. With interesting introductory remarks, Propeller Ingram presented "Finny Fighters," a 30-minute movie reel in sound . . . which proved to be the most stirring "outdoor" picture we've ever seen.

A group of wealthy sportsmen made the reel off the coast of Mexico . . . the fisherman's paradise. An 800-pound tuna is sighted and there's plenty of action as the big fellow is caught with a rod and reel. Then comes the harpooning of a giant manta, weighing several tons, from a frail rowboat. Undersea camera shots show a diver working amid the beauties of the ocean. Then follows a mortal duel between a 120-foot whale and a 14-foot swordfish. It's a grand film . . . and the Club is grateful to its sponsors for bringing it to us.

● Next Meeting.

As we go to press, announcement of the January 26 meeting reaches us:

Through the courtesy of Westinghouse Electric and Manufacturing Company an industrial movie, "New Frontiers," will be projected.

Chairman of the day is W. Edgar Martin.

Secretary Allen announces the election to membership of Homer Beach, of the Log. Welcome aboard, Homer!

● V. W. Hoxie Home Again

V. W. Hoxie, Manager of Babcock & Wilcox Company's Marine Department on the Pacific Coast, returned to his San Francisco headquarters recently after a few weeks business trip to New York. En route West Mr. Hoxie visited New Orleans and Los Angeles.

While in New York he attended the Babcock & Wilcox Company's Marine Department Sales and Engineering Conference during which modern trends in marine practice were brought before the various company representatives throughout the United States.

Trade Winds

MANHATTAN RUBBER MFG. DIVISION

With A. R. Bradshaw as manager, and E. O. Spencer, assistant manager, Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., has opened a Western branch office and warehouse at 778 Brannan Street, San Francisco. Mr. Bradshaw for some time was representative of the division in the Western territory. Mr. Spencer was formerly with Plant Rubber & Asbestos Works, and this latter organization continues as distributor for the division in San Francisco and Los Angeles. The new branch is designed to provide improved service for the Pacific slope and will carry a complete stock of mechanical rubber goods.

NEW DISTRICT MANAGERS APPOINTED BY CRANE CO.

In pursuance of a plan started some time ago to provide closer relations with the trade and between branches, general office, and factories, Crane Co. announces the establishment of two new sales districts—the East Central and the South Eastern—in charge of C. S. Pitkin and J. G. Johns, respectively. Mr. Pitkin has been manager of the Pittsburgh branch since it was established in 1922, and Mr. Johns, at Birmingham, since 1920. Other changes in local branch management are as follows:

H. M. Moss, sales manager at Pittsburgh, succeeds Mr. Pitkin as branch manager.

F. D. Morrison, assistant manager at Birmingham, becomes manager, succeeding Mr. Johns.

F. W. Zander, manager at Buffalo, retires from active management on account of ill health but has consented to remain as special representative.

G. E. Anderson, manager of Lima branch, has been transferred to Buffalo as Mr. Zander's successor.

E. R. Henning succeeds Mr. Anderson as manager at Lima.

The retirement of H. L. Wood, Sioux City, Iowa, also on account of ill health, moves T. R. Brady, manager of the Rockford, Ill. branch to Sioux City as manager, and R. E. Doherty, sales manager at the Portland, Ore. branch, is made manager at Rockford.

S. S. Day, manager at Sacramento, California, has asked to be relieved of active duty after many years of service. He will remain as special representative, and be succeeded as manager by E. B. Moor, who has been assistant manager.

REPRESENTATION FOR KEASBEY & MATTISON

V. L. Burner, Northern California manager for the Mundet Cork Corporation, announces the appointment of that firm as Northern California distributors and applicators for the Keasbey and Mattison Company asbestos and magnesia products. The Mundet Cork Corporation has now on hand, and will maintain at its San Francisco warehouse, a complete stock of asbestos and magnesia products, in addition to its own line of cork insulation products. This corporation also maintains a competent engineering and contracting division, ready at all times to solve industrial and marine insulation problems, and to install and service insulation in all applications where its use is indicated.

Horace S. White, former sales manager of the New Jersey Asbestos Company, has organized the H. S. White Company, located at 44 Water Street, New York, to specialize in mechanical packings and marine engineering equipment. White is a native of Baltimore, is well known in maritime circles, and has a broad experience in marine engineering sales work. He has taken an active part in the Propeller Club and the New York Maritime Exchange.

Everything grows so large out here in California. Even the fish stories! But you can't fool the camera —much! Here is Jim Vizzard, member of the Propeller Club of California taking a sea-bass (or sand dab) for a ride. When interviewed, our hero remarked: "You should have seen the one Joe Di Maggio caught!"

Sperry Event

The third annual dinner of the Sperry Employees' 15-Year Service Club was held Friday night, January 15, at Trommer's Hall in Brooklyn. The dinner is a testimonial in honor of twenty-three people who on January 1 rounded out twenty years with the Sperry Gyroscope Company, Inc.

The membership of the 15-Year Club numbers 202 and includes all employees of the company, both men and women, regardless of rank or position, who have had at least fifteen years of service.

Preston R. Bassett, Vice-President in Charge of Engineering, president of the club, will introduce the speakers, who will include:

Thomas A. Morgan, Chairman of the Board of Directors, and **Reginald E. Gillmor**, President and General Manager. Mr. Gillmor, on behalf of the management, will present each of the honor guests with either a gold watch or a silver service.

Members of the honor group are:

Anton Bauernhuber
Mrs. Julia Bergen
Louis F. Beyer
Walter Black
John Burkhardt
William Cabre
John R. Conover
Adam J. Eifler
Robert Fleischer
Charles K. Gartner
Hans Gronneberg
William R. Hight
Fred Hinricks
Joseph G. Horner
Otto A. Koerner
William Kronenberger
George S. Lambert
Anthony Lau
Jasper J. Luciano
George G. Riley
Otto H. Rughaase
George D. Temme
Arthur O. Tornquist

There is now a total of seventy-one employees having twenty years or more service with the Sperry Company.

Hawaii Drydock Award Postponed

Award of a contract for construction of the proposed floating drydock for Pearl Harbor, Hawaii, will be deferred by the Navy Department until after Congress meets. Navy yards at Mare Island, California, and Bremerton, Washington, have been unable to reduce their estimates for construction of the drydock to the $10,000,000 appropriation by Congress, and the Navy Department will ask the new Congress for additional funds.

Only one commercial company submitted a bid, the Bethlehem Shipbuilding Corporation of New York, which was in the amount of $21,312,000 for a drydock complete with all accessories. Alternate bids were also submitted by the company, deducting various equipment, which reached a minimum of $16,000,000.

From New York comes word of the appointment of **Emil Mildenberger** as treasurer of Luckenbach and its affiliated companies. Mildenberger succeeds Paul Kuhne, who is deceased. He has been associated with the company for 22 years, and is well known in Atlantic Coast steamship circles, at one time serving as president of the Water Line Accounting Officers.

Further appointments include **Harry V. Umbach**, as auditor of disbursements, and **Charles M. Miller**, as auditor of receipts.

Still another promotion is that of **Edward F. Knight** assistant publicity manager of the French Line in New York, who has been given the post of publicity manager by **Henri Morin de Linclays**, resident general manager of the line, the appointment having been confirmed by **Henri Cangardel**, managing director, in Paris. Knight entered his eighth year in the service of the company on the first of last month, going with French Line after a career with the army, in which he now holds the rank of major in the Reserves.

International Lifeboat Races

Joseph J. Kelleher, VicePresident of the United Fruit Company, was elected President of the International Lifeboat Racing Association at the annual meeting held yesterday in India House. Other officers, directors and members elected were:

Vice President—Captain John W. McGrath, President, John W. McGrath Corp.

Vice-President—George H. Dalzell, Vice President, Dalzell Towing Line.

Directors:

Hon. Frank J. Taylor, Comptroller, City of New York.

Robert L. Hague, General Manager Marine Dept., Standard Oil Co. of N.J.

Joseph W. Powell, President, United Dry Docks, Inc.

John McAuliffe, President, Isthmian S.S. Co.

Willard F. Jones, Manager Marine Dept., Gulf Refining Co.

Capt. Louis Le Friant, Marine Supt., French Line.

Members:

John E. Craig, President, Clyde-Mallory S.S. Co.

James A. Farrell, Jr., President, American-South African Line.

Daulton Mann, Executive Vice President, Grace Lines, Inc.

J. J. Maguire, Manager Marine Transp., Socony Vacuum Oil Co.

John McAuliffe, President, Isthmian S S. Co.

Karl Nielsen, Local Inspector of Hulls, Bureau of Navigation & Steamboat Inspection.

C. H. C. Pearsall, President, Colombian S.S. Co.

Joseph W. Ryan, President, International Longshoremen's Association.

H. W. Warley, Vice President, Calmar S.S. Co.

Robert L. Hague, general manager of Standard Oil Co. of N.J., retiring president, received a standing vote of thanks for the valuable service he had rendered to the Association during the past year.

VOYAGES

Our voyager . . . Thomas J. Halcrow, Jr. Born . . . literally on the deck of a square rigger. Thomas J. Halcrow, Senior, was a shipmaster of the sailing ships days, the skipper of ships in the Vancouver-Australia run. No back yard apple trees for young Tommy in his climbing days . . . but the shrouds and ratlines of a wind jammer out on the broad Pacific!

And speaking of climbing . . . here are some high lights of his transportation career:

Pacific Mail Steamship general offices in 1919.

Los Angeles Steamship cashier's office in '21.

Transmarine Lines as East Bay representative.

Encinal Terminal, in charge of westbound freight traffic, 1925.

Garland Line, district freight agent.

Williams Line, East Bay representative.

American-Hawaiian, Oakland district manager.

"Tom's" hobbies, he confides, are his wife, his daughters . . . and his friends!

James Craig Peacock, formerly director of the Shipping Board Bureau of the Department of Commerce and special counsel to the United States Maritime Commission, announces that he has resumed the active practice of law and has become associated with the firm of Williams, Myers and Quiggle as counsel.

R. H. Overstreet, for fourteen years connected with the old Shipping Board, was appointed to the post of examiner with the Maritime Commission, after completing a shipping survey for the Brookings Institution. He will act as a link between the Government shipping agency and shipowners for the securing of applications for construction and operating differential subsidies authorized by the Ship Subsidy Act. Overstreet has many contacts with the shipping industry, owing to his long service with the Shipping Board and the NRA Shipping Code section.

Thos. J. Halcrow, Jr.

Jim Robinson Made Vice-President of Crane Limited

With the beginning of the new year, **J. L. Robinson** assumed the office of Vice-President of Crane, Limited, Canada. He succeeded J. Austin Murphy, who has retired from active service after fifty-one years with the company.

"Jim," as Mr. Robinson is familiarly known thoughout Canada, joined Crane Co. in 1907 in the San Francisco branch. In 1919, when the company started its Canadian expansion, he was transferred to Montreal, where he worked his way up to the position of director and general sales manager. From this position he now steps up to the office of vice-president with complete supervision over Crane Limited and its subsidiaries.

J. L. Robinson.

STANFORD ALMOST PLAYS HAMMOND'S BLOOMER GIRLS

Len Rea, treasurer of Hammond Shipping Company, home town Alameda, was asked to help line up a game between the Stanfords of Palo Alto and the Alameda Elks baseball team. Len wrote the manager of the Cards for a spot on the schedule. He wrote on the Hammond Lumber Company letterhead.

Next day the "San Francisco Chronicle" published Stanford's 1937 Baseball Schedule, and low and below—Len Rea read same and it said right off the bat—"JAN 31—HAMMOND LUMBER CO. vs. STANFORD!"

Wasn't any airmail to Palo Alto, but Rea post haste special-deliveried the following letter to his friend Harry M. Wolter down on the Indian campus:

Dear Harry:

Want to thank you for your good offices in arranging the baseball game to be held at Stanford on January 30th between your Varsity Team and the Alameda Elks, and I presume that Bob Smale, manager of the Elks team, has already advised Mr. Eddie that the boys would be on hand that day to play the game.

However, in reading the sporting sheet of the San Francisco Chronicle this morning I noticed that the first game scheduled for Stanford was with Hammond Lumber Company. Of course, this gives us very short notice for our company to play a baseball game against your seasoned players. Of course, as we do not have nine men available who could play the game, and due to the fact that our star player, Leonard Hammond, is now up in the wilds of Humboldt, we hope that it will be satisfactory to place some of the charming young ladies in our office in some of the positions on the team. This fact might be a disadvantage to your team, as the Stanford boys might pay more attention to some of our players than they would the ball game. Therefore, I think it would be much safer, to maintain the Stanford honors, to forego the game with Hammond Lumber Company and play the game with the Alameda Elks.

With kindest regards, I am,

Yours sincerely,

S. Leonard Rea.

Personals

A recent advancement is that of **Arthur L. Hewitt**, district passenger agent in Los Angeles for the French Line during the last two years, who has just been made assistant general agent under **John J. Scotto**, general agent over the southwestern four states and Australia. Hewitt was with the International Mercantile Marine Company for eight years prior to going with the French Line.

Barber Steamship Lines, Inc., New York, through **Edward J. Barber**, president, has announced a number of promotions. Those named are: **J. F. Murphy**, from assistant secretary to secretary; **Hunter J. Finch**, from traffic manager to vice president and traffic manager; and **James B. Young**, long an employee, to the post of vice president. The Pacific Coast manager is **Perry S. Newcomb**, who is located in Los Angeles.

The Cunard White Star Line has opened its own passenger office in New Orleans, in the Whitney Bank Building. The office is in charge of **E. James Rogers**, who was formerly connected with the Chicago office. Rogers began his career in the Liverpool offices of the White Star Line, and has since been in many of the offices of its associated companies.

Copeland Shipping, Inc., New York, has a new member—**Royal S. Copeland, Jr.**, son of the senior senator from that state.

The U. S. Customs Inspectors recently presented **Dr. Joseph Bohec**, ship's doctor of the French Line flagship Normandie, with a wrist watch on board the ship in appreciation of the services rendered to Customs Inspector William Heneberry, whom he attended when the latter was stricken with a heart attack recently. Dr. Bohec and his assistants gave every aid possible, but to no avail, the attack proving fatal in spite of their care. Presentation of the watch was made by **Milton P. Jackson**, assistant surveyor of the Port of New York, the watch being inscribed "For meritorious services rendered—presented by the Customs Inspectors of the Port of New York."

After a lingering illness, **Monty Joseph Wright** passed away at his home in San Francisco on January 16, at the age of 51. Monty was for some time connected with the American Mail Line, opening up the company's offices in the Orient when it entered the transpacific trade. Later, in 1922, he joined Luckenbach as district manager in Seattle, for whom he came to San Francisco as Pacific Coast manager in 1926, which position he held up until a year ago, when he was forced to retire because of ill health.

His physician held out little or no hope for his recovery for some time prior to his passing, but Monty's death came as a great shock to his many friends, who admired him not only for himself but for his knowledge of the shipping industry.

Shipbuilding

(Continued from Page 50)

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19'8"; estimated delivery, June and August, 1938.

Order placed for **DD415, O'Brien,** and **DD416, Walke,** two destroyers; no dates set.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn,** light cruiser. L.B. P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu,** light cruiser; L.B. P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935. Estimated launching indefinite; estimated delivery, May 1, 1938.

CL 50, **Helena,** light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December, 1936; launching indefinite; contract delivery, May 16, 1939.

CG 69 and CG 70, **Alexander Hamilton** and **John C. Spencer,** cruising cutters for U.S.C.G. service; L.B.P. 308'; beam 41'; standard displacement 2000; geared turbine drive, express type boilers; keels laid Sept. 11, 1935; floated November 10, 1936; estimated christening date, January 6, 1937; estimated delivery, March 1, 1937, and March 15, 1937, respectively.

DRYDOCK AND ROUTINE REPAIRS: Coast Guard cutter **Campbell** arrived November 19 for completion of uncompleted work, and minor repairs and alterations. **Erie** arrived December 30, 1936, for docking, preparation for final trials, and completion of uncompleted work.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION: **One Coast Guard Cutter;** LBP 308', LOA 327', breadth, molded, 41', draft 12'6", displacement 2000 tons. Keel laid August 15, 1935; estimated launching, January 14, 1937; estimated completion, April 15, 1937.

Order placed for **DD407** and **DD418,** two 1500 ton destroyers; no dates set.

UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404,** 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION: **SS179 Plunger,** keel laid July 17, 1935; L.B.P. 292'6", beam 25', loaded draft 15'; launched July 8, 1936; estimated delivery Feb., 1937; **SS180 Pollack,** keel laid October 1, 1935; L.B.P. 292'6", beam 25', loaded draft 15'; launched September 15, 1936; estimated delivery May, 1937.

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion March 1, 1938; **SS186 Stingray,** submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

Two-Way Radio for City Fireboats

New York's nine fireboats will soon be linked by radio to the Manhattan Fire Alarm Central Office when a new two-way radiotelephone system, being furnished by the General Electric Company, is installed early next spring. Although such systems are now used by several police departments, this represents a new era in communication for fire departments. The system was laid out by the engineers of the Fire Department Telegraph Bureau under the direction of Chief Fendrich. In comparative size, it will be the second largest two-way system, second only to the police-car system used in Boston, Massachusetts.

The need for this modern means of communication can be fully appreciated when it is realized that the boats, at present, are completely out of touch with the alarm office when they are away from their docks. The period of no communication may extend for one or two days in cases of severe marine fires. With the radio system, they will always be in direct contact with head quarters, assuring quick action no matter when an emergency arises. It will be an invaluable aid in expediting the handling of injured persons or those suffering from exposure. Smaller high speed motorboats can be ordered to carry such persons promptly to hospitals.

The new system will provide duplex communication identical to an ordinary telephone conversation, with no switching operations necessary to change from talking to listening and vice versa. Briefly, the equipment will include a remote control 500-watt medium high frequency central transmitter for direct radio communication to all fireboats. The return part of the conversation from the boats will be transmitted by ultra-high frequency radio to pickup receivers located at strategic points in the area to be covered, and from each of the pickup locations via wire lines to the Manhattan Fire Alarm Central. Each boat equipment will include a 50-watt ultra-high frequency transmitter, medium high frequency receiver, antenna and power supply. The site selected for the central transmitter is the Fire College Building in Queens.

The two-way radio system will only be in use when the boats have left their docks; at all other times direct wire-line calls can be made from the central office to the men in the dockhouses. The new radio installation, however, will enable the headquarters control point to be in direct and immediate communication with all boats at all times, whether they are at the docks or in the harbor waters.

The pickup receiver locations have been selected so that at least one receiver will be within the communication radius of a fire boat at any point in the harbor waters.

The installation of the equipment necessary for this two-way communication system will be made under the combined supervision of engineers in the Fire Department Telegraph Bureau and General Electric engineers.

New 4-Cycle Diesel at Motorboat Show

A feature of the Fairbanks, Morse & Co. exhibit at the New York Motor Boat Show was the initial showing of a new series of medium-speed, 4 cycle diesel engines. On display were a 6-cylinder, $8\frac{1}{2}$ inch x 10 inch unit, which delivers its rated horsepower at 720 r.p.m.

The new series will be built in two cylinder sizes and in combinations of six and eight cylinders, with power ratings from 180 to 280 horsepower. Built-in reduction gears will be offered to afford a wide range of propeller speeds. The entire line will be available for electric generating as well as propulsion service. While the series is of conventional 4-cycle design it embodies several original features, reflecting a sound knowledge of marine power needs.

New Diesel Engine Pyrometer

A new pyrometer, designed especially for diesel engine service, has just been announced by the Brown Instrument Company.

This instrument is available in three temperature ranges; namely, 0-1000° F., 0-1200° F., and 0-1600° F., and with the following combinations of switch points: 4, 6, 8, 12, 16, or 24. The 0-1000 degree F. range instrument is also available with "cold," "normal," and "danger" operating zones plainly indicated on the scale. Great vibration resisting qualities have been built into this pyrometer by designing it for extreme ruggedness and light weight.

The measuring system, highly sensitive in all standard ranges, is rugged and is capable of close accuracy under the severest diesel engine service. It is provided with a special neutralizer having a negative temperature coefficient, thus permitting the use of heavy springs in the system while still maintaining a low overall temperature coefficient.

The pyrometer case is of light weight molded bakelite to assure a permanent finish, and is thoroughly water proof. A dial type switch, integral with the pyrometer, is mounted in a separate compartment of the pyrometer case, enabling an operator to select temperature indications with the utmost convenience from any number of thermocouples within the range of the combinations mentioned above. Switch points are made extra large to withstand hard usage.

Elimination of a terminal board from the case has further promoted ruggedness and compactness. Leads, 20 inches long, are brought from the switch points through a pipe fitting in the bottom of the box. This construction permits use of a junction box at a remote point where vibration is non-existent or less severe than at the instruments, thus assuring tight, rugged electrical connections. The pipe fitting is suitable for back or bottom connections.

An enameled metal scale 3-7/16 inches wide, printed in black and white, avoids the use of a paper scale, which is apt to work loose or become discolored.

Each pyrometer is calibrated within 1 per cent of full range in the normal operating zone and within 2 per cent outside that zone.

Certificates and Discharge Books

(Continued from Page 45)

has been appointed, may furnish the seaman with a temporary certificate of discharge (Form 719-A) at the completion of the voyage, and this fact shall be noted on the articles. When the duplicate book has been issued, the record of shipment and discharge as shown on the temporary discharge will be entered in the book, and the temporary discharge shall be surrendered to the issuing officer.

(g) To facilitate the keeping of a complete record of the entries made in the continuous discharge books, the Shipping Articles have been revised to include the following items: On the front of the agreement the following information has been added: Name of ship; official number; port of registry; date of registry; registered tons; gross and net; horsepower of engines; name and address of the registered managing owner or operator; number of seamen and apprentices for which accommodations are certified; and class of ship.

(h) Columns have been added to the articles under "Particulars of engagement" for entering the continuous discharge book number and serial number of license or certificate of service; and under "Particulars of discharge", columns have been added to show the place, date, and cause of leaving ship, or of death, also a column for mutual release.

(i) On the back of the Shipping Articles the following have been added:

A certification to the effect that such entries as are authorized by section 3 of the act of June 25, 1936, to be made in the continuous discharge books agree with those made on the articles, to be signed by the U. S. Shipping Commissioner or other officer duly authorized to act as such.

A table showing citizenship requirements.

A recapitulation for showing the percentage of Americans on the articles and a certification as to the correctness of same to be signed by the U. S. Shipping Commissioner or other officer duly authorized to act as such.

A summary to show the different nationalities of the crew, segregated by departments.

Extracts from the laws for the information of masters.

(j) In the future Shipping Articles shall be made out in triplicate. One of the copies shall be retained by the shipping commissioner and the original and a copy given to the master who shall enter therein any changes made in the crew during the voyage. In case of the paying off of any members of the crew during the voyage, they shall be required to sign the mutual release on both the original and the duplicate of the articles whether discharged before a shipping commissioner in an American port or before an American Consul in a foreign port. At the completion of the voyage, when the crew is paid off, the mutual release on both the original and the duplicate of the articles must be signed by all members of the crew; and the original copy, which must contain a complete record of the entries made in all continuous discharge books, shall be

forwarded to the Bureau at Washington. The duplicate copy shall be retained by the shipping commissioner.

(k) All columns on the Shipping Articles shall be properly filled in and the certifications on the back properly signed. All entries made in the continuous discharge books shall be shown on the ship's articles.

(l) Every seaman shall be required when signing articles, to produce his continuous discharge book or temporary certificate of discharge, as well as his license or certificate of service, in order that the serial numbers may be entered on the articles.

The foregoing supersedes any rules and regulations heretofore issued conflicting herewith.

Approved, December 22, 1936.

Daniel C. Roper,
Secretary of Commerce.

[F. D. Doc. 3936—Filed, December 23, 1936; 10:28 a.m.]

[1] Form 719-B was filed with the Division of the Federal Register; copies are available upon application to Bureau of Marine Inspection and Navigation, Department of Commerce.

Bureau of Marine Inspection and Navigation

DESIGNATION AND APPROVAL OF NAUTICAL SCHOOL SHIPS

To United States Supervising Inspectors and Others Concerned:

Under the provisions of Section 13 of the Act of March 4, 1915 (38 Stat. 1150; 46 U.S.C. 672), as amended by Section 1 of Public No. 808—74th Congress (49 Stat. 1930), graduates of school ships approved by and conducted under rules prescribed by the Secretary of Commerce may be rated able seamen after twelve months' service at sea after graduation.

It has been made to appear to the satisfaction of the Secretary of Commerce that the school ships operated by the States in which they are located; namely, California Nautical School, Massachusetts Nautical School, New York Merchant Marine Academy, and Pennsylvania State Nautical School, have adopted a course of study complying with the rules prescribed by the Secretary of Commerce and a system of regulations adequate to equip the students with the theory and practice of navigation necessary to qualify the graduates for the rating of able seaman.

The school ships conducted by the State organizations above named are hereby approved and their graduates, if meeting the other qualifications required by law and regulations promulgated thereunder, are entitled to the rating of able seaman and to be certificated as such.

Approved, January 7, 1937.

(Seal) DANIEL C. ROPER
Secretary of Commerce.

(F.R. Doc. 37-77; Filed, Jan. 8, 1937; 11.56 a.m.)

Rules for the Conduct of School Ships

Section 13 of the Act of March 4, 1915 (38 Stat. 1159; 46 U. S. C. 672), as amended by Section 1 of Public No. 808—74th Congress (49 Stat. 1930), provides that graduates of school ships approved by and conducted under rules prescribed by the Secretary of Commerce

may be rated able seamen after twelve months' service at sea after graduation.

Pursuant to the above cited provision, the following rules are hereby prescribed for the conduct of such school ships:

1. The course of study shall include (a) all the instruction in the fundamentals of navigation necessary to fully equip the student with the theoretical knowledge required for the proper discharge of the duties devolving on able seamen; (b) the privileges and disabilities appertaining to the rating of able seamen, their duty to obey all lawful orders coming from their superior officers, and the rules of conduct to be observed in order that proper discipline may be maintained on shipboard; (c) the fundamentals of ship sanitation as prescribed by law and regulations.

2. A thorough practical training in the mechanics of all operations incident to the sailing and management of a vessel in so far as such operations form a part of the duties of able seamen, including intensive instruction and practical training in all the operations incident to fire and lifeboat drills, both in port and at sea.

Approved, January 7, 1937.

(Seal) DANIEL C. ROPER
Secretary of Commerce.

(F.R. Doc. 37-78; Filed Jan. 8, 1937; 11.56 a.m.)

Thos. G. Baird Adds to Lines

Thos. G. Baird, well known manufacturer's representative in the San Francisco Bay area, has recently added to his "lines" the famous "Skookum" tackle block manufactured by The Skookum Company, of Portland, Oregon. This block has gained a great reputation with the lumbermen of the Northwest for its sturdy efficiency and long life under severe usage.

All Skookum tackle blocks are fitted with manganese steel sheaves, Timken roller bearings, and tool steel shackles. This type of block is meeting with a very favorable reception among ship operators, owing to its strong construction and its ability to stand up and "take it."

Mr. Baird also represents the Hunt Spiller Manufacturing Company, producers of the famous Hunt Spiller "Gun Iron" and "Gun Iron" castings. This iron is widely used for cylinder liners, piston rings, and other applications where long-wearing cast iron is essential.

Worthington Consolidation. Effective January 1, 1937, the Worthington Company, Incorporated, with offices in Seattle, San Francisco, Los Angeles, and El Paso, was absorbed by its parent organization, Worthington Pump and Machinery Corporation, of Harrison, New Jersey.

This announcement follows that of December 28th, covering the absorption by Worthington of its subsidiary, Carbondale Machine Corporation, builders of refrigeration, ice manufacturing, and air conditioning equipment.

A Novel Launching

A novel launching was held at Russell Erie Basin Shipyard Inc., Erie Basin, at the foot of Columbia Street, Brooklyn, recently when the Greyhound One, first of two modern fishing trawlers for the Greyhound Trawling Company, Boston, took the water.

Instead of the usual type of ways, the craft, which measures 128 feet 6 inches in length and 24 feet in beam, had been built on a cradle parallel to the water, from which it was lifted bodily into the water by a huge derrick.

Greyhound One is built to new standards in the fishing industry. Her hull is entirely of wrought iron and she has a "maierform" bow, designed to permit the use of full power in heavy seas. Within her hull there will be an inner shell of nickel-clad steel which will serve as the fish hold. Between this shell and the hull itself there will be 2 inches of solid cork insulation and an additional four-inch air space.

The air space and the cork lining will serve to maintain cool temperature in the fish hold even in the hottest summer weather. The bi metal construction of the inner shell will give an interior surface of solid nickel for metal parts that come into contact with the fish. Being rust-proof and easily cleaned, the nickel lining provides a sanitary surface that will help prevent contamination of the fish. Power for the craft will be supplied by 615 horsepower McIntosh and Seymour diesel engine.

Building of still another trawler for the same company already has been authorized, and several more are contemplated for various other companies. A trawler to follow Greyhound One at Erie Basin will also be equipped with the same type hold.

The nickel-clad steel used in the construction of the hold consists of layer of solid nickel rolled on a heavier layer of carbon steel in such a fashion as to form a permanent bond that can be destroyed only by grinding.

Woman is licensed customs broker. J. Walter Doyle, U. S. collector of customs for Hawaii, issues federal certificate to Kathryn De Freest Goskirk, at Honolulu, making her one of the few licensed customs brokers in America.
—Pan-Pacific Press Bureau Photo.

PACIFIC MARINE REVIEW ADVERTISERS

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J. S. Hines	B. N. DeRochie	Alexander J. Dickie	Paul Faulkner	F. Dryden Moore
President and Publisher	Assistant Publisher	Editor	Advertising Manager	Assistant Editor


FOUR SHIPS of this Federal design are now proving themselves in actual service. Two are in the fleet of the Standard Oil Company of New Jersey. Two fly the house flag of the Pan American Petroleum & Transport Company. They are earning a reputation for efficiency and economy.

PACIFIC MARINE REVIEW

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Editorial Comment »« »«

America's Share in Pacific Ocean Shipping

This Pacific Ocean, o'er whose vast sea pastures and wide, rolling, watery prairies the waves rise and fall and ebb and flow unceasing, is the greatest of all the seas. Herman Melville said of this sea: "It rolls the midmost waters of the world, the Indian Ocean and the Atlantic being but its arms. The same waves wash the new built California towns, but yesterday planted by the recentest race of men, and lave the faded but still gorgeous skirts of Asiatic lands older than Abraham, while all between float milky ways of coral isles, and low lying, endless, unknown archipelagoes and impenetrable Japans. Thus this mysterious divine Pacific zones the world's whole bulk about; makes all coasts one bay to it; seems the tide beating heart of earth."

These words were written about 75 years ago by an American author working as a seaman on an American whaler in the South Pacific, and appear in that grand classic of the sperm whale fisheries, Moby Dick. They are good words to meditate on in the light of what has happened on and around this Ocean since Moby Dick was written, and keeping in mind that one human life might easily span the period.

The new built California towns have grown into great cities, as have also quite a few then non-existent towns in California, Oregon and Washington. The inhabitants of Asiatic lands have shaken off their "faded but gorgeous" skirts and are demanding a large place in modern civilization. The "coral isles and the unknown archipelagoes" have been surveyed, staked out, and mostly put to intensive production of tropical products. "Impenetrable Japan," forced to open up by a few wooden ships of the American navy, has become one of the ranking powers of the earth. Her capitol is one of the largest cities of the world. Her commerce, reaching every country on the globe, is today one of the great disturbing factors in competition for world trade.

Today every maritime nation is actively competing for trade on the Pacific. To serve this trade, European nations are constantly building faster and more economical cargo and passenger liners. The marine trade of Japan is all in a sense Pacific Ocean trade, and Japan, in 1936 alone, launched nearly 300,000 gross tons of modern steam and motorships to take care of her expanding commercial marine transport. She is now the world's third shipbuilding power, being exceeded last year only by Great Britain and Germany.

The United States has a very large share in Pacific Ocean trade. This share in normal years would approximate a value of a billion dollars, and is steadily growing. For the past five years not one American ship has been ordered to engage in the Pacific Ocean trades, except two oil tankers now under construction, and no American cargo vessel has been ordered for these trade lanes in the past 14 years.

The point we wish to emphasize is that every other maritime nation in the world is building cargo liners for Pacific Ocean commerce, and we who have the largest stake therein and the best opportunity to improve that stake are doing nothing.

All signs point to a great expansion of prosperous international trade in Pacific Ocean areas. America is in the best strategic position to profit by that expansion. America should get ready to take care of this increased trade economically and efficiently.

Enforcement of Copeland Safety at Sea Act

In the Federal Register of February 10 appears the following dictum over the signature of Secretary of Commerce Daniel C. Roper:

Section 7 of the Act of June 25, 1936 (Public No. 808—74th Congress; 49 Stat. 1936), makes it the duty of the Secretary of Commerce to enforce the provisions of the above Act through collectors of customs and other government officers acting under the direction of the Bureau of Marine Inspection and Navigation, and to make such rules and regulations as he may deem necessary to carry out the provisions of the said Act.

In order to enforce more effectually compliance with the provisions of this Act, United States Shipping Commissioners are hereby designated as enforcement officers for carrying out the provisions of the Act.

Approved, February 9, 1937.

Shipbuilding in America and in the World

Lloyd's annual summary of the "Mercantile Shipbuilding of the World" is usually a very interesting document, and the summary for 1936 is no exception to this rule. Perhaps the most significant "first" for which 1936 will be remembered is the fact that during the year oil overtook coal as a fuel for the world's merchant fleets. By this we mean that for the first time in history the total gross tonnage of new and old steamers and motorships burning oil exceeded that of new and old steamers burning coal.

Total output of the world's shipyards during 1936 in vessels of 100 gross tons and upward was 999 hulls, aggregating 2,117,934 gross tons. This figure is the highest recorded since 1930, and represents increase of 815,544 gross tons as compared with 1935, and of 1,150,505 gross tons as compared with 1934. In this connection attention is called to the curves reproduced on page 46 of this issue. These curves indicate that the average gross tonnage launched during the past five years, 1932-1936, is about 1,369,000 tons less than the average for the last five pre-war years, 1909 to 1913. This fact would seem to indicate further expansion for world shipbuilding.

The trends of types of vessels and of machinery are very interesting:

530 vessels aggregating 1,202,476 tons are motor vessels employing internal combustion engines. Electric drive is used on four of these vessels.

416 vessels aggregating 877,746 tons are steamers. These steamers include: 35 vessels of 244,914 gross tons fitted with steam turbines; 97 vessels of 267,234 gross tons fitted with reciprocating engine and turbine combinations; and 284 vessels of 365,598 gross tons fitted with reciprocating engines. Somewhat more than 300,000 gross tons of these steamers are fitted to burn oil under their boilers, and 500,000 gross tons burn coal.

Oil tankers, exceeding 1,000 gross tons each, accounted for 94 vessels and 676,000 gross tons of the total.

The total number and tonnage of vessels built to the Isherwood system of longitudinal framing, excluding those under 1,000 gross tons, was 33, of 246,013 gross tons, all of which were oil tankers. This system is also used in part in 54 vessels, of 349,722 gross tons, of which 43 are oil tankers.

It will be noted that the average gross tonnage of steamers is 2,100, and that for motorships is 2,200.

Five countries had an output upward of 100,000 gross tons. These were:

Great Britain and Ireland	856,257 tons
Germany	379,981 tons
Japan	294,861 tons
Sweden	154,044 tons
United States	111,885 tons

These five countries, therefore, comprise 85 per cent of the world's shipbuilding for 1936. United States has only 5 per cent of the total.

Of the seagoing vessels built in 1936 and now building in American yards, almost 100 per cent are tankers. Of those building in the world outside the United States, less than 30 per cent are tankers. It is very evident that we in America are very rapidly coming to the time when we must build modern cargo liners if we are to stay in the business of carrying cargo under the American flag.

For further information on this subject see graphs and table on page 46 of this issue.

Two years back practically every established shipping line in America had active shipbuilding plans in contemplation. These were all held up by the new Merchant Marine Act, which changed completely the Federal Subsidy picture and the Federal control of shipping. The delay in appointment of the Maritime Commission, followed by pre-election appointments, which were frankly considered to be temporary, has further held up the normal American shipbuilding program. In the meantime, American shipyard business has grown greatly on the building of oil tankers.

Modern cargo carriers are much needed in the American merchant marine, to compete with the large fleets of such vessels recently built in Europe and in Japan. The Merchant Marine act empowers the Merchant Marine Commission to build such vessels and to charter them to responsible American ship operators.

The shipbuilding program advocated by the former U. S. Shipping Board, and now under advisement by the Maritime Commission, is a wise forward-looking plan from the standpoint of national defense, and may be made very practical from the standpoint of the merchant marine.

These eight and ten thousand ton cargo liners of 16 to 20 knots speed, if wisely designed and economically powered, should be able to compete in operating economy with any of the modern vessels of comparable class under other flags. In plans for building these ships to be chartered to established and responsible American operators, provision should be made for alterations to suit charterers while the vessels are still under construction. An American operator on any given route might want one or more ships of this capacity and speed, but he might need to have a certain passenger, or refrigeration, capacity not provided in the standard plans. Another operator might use one or more if they conformed to certain draft limitations encountered on his route.

In other words, and in one sentence, the Maritime Commission should be fixed and inflexible in its main policy of operating the American Merchant Marine for safe and economical marine transport, and should be very flexible in its management of details, so that its every action may be bent towards its controlling purpose.

Pacific Marine Review Twenty-Five Years Ago

On the 20th of March, 1912, there was issued the third number of the ninth volume of *Pacific Marine Review, First Established and Only Exclusively Marine Paper Published on the Pacific Coast*, from its offices at 379, 380 Arcade Annex, Seattle, Washington—its motto, "Be just and fear not"—its "proprietor," H. B. Jayne—its editor, Captain Emil Franke—its printer, A. A. Sherman.

Principal lead articles all discussed the Panama Canal tolls, and were mainly concerned with getting adopted a policy which would favor American flag ships in the application of tolls for using the canal.

Of particular interest to Pacific Coast readers are three items appearing as news in this number.

(1) A page article is made up of notes from specifications written by Geo. W. Dickie, N. A. and M. E., of 21 California Street, San Francisco, for a new steamer to be built for the Pacific Coast Company. This steamer was built by the New York Shipbuilding Company at Camden, New Jersey, and christened Congress. "Pacific Marine Review notes with regret that this fine vessel will be a coal burner, which, no doubt, and justly so, is due to the Pacific Coast Company's large interest in coal mining properties." Congress has had a checkered career, first in the Pacific coastwise trade, then as the Nanking in the transpacific trade of the China Mail S.S. Co., and now as the Emma Alexander in the fleet of the Pacific Steamship Lines, Ltd.

(2) Motorship Selandia (first of the East Asiatic Company seagoing motorships) had, on February 14, completed a very successful trial trip off Copenhagen. Burmeister & Wain, the builders of ship and engines, had two sister motorships, the Fionia and the Jutlandia, at their outfitting dock nearing completion for the same owners. Six smaller vessels for the same fleet were on order.

The Selandia is still in service, and has covered 1,200,000 miles. She was sold by her original owners a few months back, and is now named Norseman.

(3) A full-page obituary recorded the death of Charles Page, noted Proctor in Admiralty, whose son, Charles R. Page, has just been elected president of Fireman's Fund Insurance Company, as recorded elsewhere in the present issue.

Charles Page, son of an American physician, was born in Valparaiso in March, 1847, graduated from Yale in 1868, completed his education in Germany. In 1870 he came to San Francisco and entered Admiralty law practice. In 1896 he founded the law firm of Page and McCutchen, which grew into Page, McCutchen, Knight and Olney. He was president of the California Title Insurance and Trust Company, and for many years a director of the Fireman's Fund Insurance Company. A great scholar and student, speaking and writing fluently in English, Spanish, French and German, Charles Page was one of the best known and best beloved members of the California bar.

An interesting item describes the very convenient repair scow of the Standard Boiler Works, Seattle, which is equipped with powerful air compressors, electric welding equipment, all types of machinery necessary for boiler repairs, and an electric light plant of great capacity, so that when this barge is towed alongside a vessel needing boiler repairs, her fire rooms and boilers can be flooded with light from the plant on the barge.

Prince Rupert, at the end of its second year as a port, showed an advance of 62 per cent in tonnage of cargo, and a record of over 14,000 passengers through the port.

After ten lean years the ocean freight rates had begun to look satisfactory to the shipowner and appalling to the shipper. Sailing vessels were still quite prominent in the Pacific Coast charter lists.

Comment on Lloyd's Register report for 1911 reveals the following interesting situation:

Total number of vessels classed	670
Total gross tonnage vessels classed	1,373,399
Total number of steamers	603
Total number of sailing vessels	67
Total gross tonnage of sailing vessels	16,808

Only six of the steamers were fitted for burning oil under boilers.

One steamer, the Shinyo Maru, had turbines installed.

Two steamers had reciprocating engine and turbine combination.

One, the S.S. Holzapfel 1, had a gas engine worked from a "suction" gas plant, and her engine was connected to the shaft through a hydraulic "transformer."*

The Alaska Coast Company had recently elected H. F. Alexander president and C. W. Wiley manager.

The Seattle Construction and Dry Dock Company had five whalers under construction.

[*This clutch and engine were the first of their kind to be installed on board ship. The experiment was backed by the late A. C. Holzapfel, president of the International Compositions Company and a great industrial chemist who saw in this combination a method of using cheap coal effectively as a marine fuel.]

Now Full Speed Ahead with

Pacific-American Shipping

For the use of the layout on the facing page we are indebted to the courtesy of the San Francisco Chronicle. It depicts scenes on the San Francisco Embarcadero and on board the ship itself, showing the activities incident to the loading of cargo aboard the S.S. President Hoover, of the Dollar Lines, and the raising of steam on that vessel, preparatory to her getting away as the first American liner to clear the Golden Gate after the late 100 days of shipping tie up.

OUR Pacific-American Merchant Marine is now in the condition symbolized by this very well posed snapshot, taken by our Portland correspondent and showing Captain Edward Anderson, of the American-Hawaiian cargo steamer S. S. Floridian, framed in the new Mackay Radio Direction Finder Loop aboard that vessel. All elements of the far-flung interests of American Commerce on the Pacific are looking forward confidently to a future full of promise, and preparing themselves with the most up-to-date and efficient mental and physical equipment for finding and transmitting intelligence that will enable operating management to move in the right direction with precision, safety, and a fair assurance of reasonable profits.

Ships are moving again on all the established routes—

Goods of commerce are ready to fill the holds of these ships in volume and variety equal to, if not exceeding, the figures of the boom days before the late depression—

For some months ahead the intercoastal vessels will be running full in both directions—

Our Pacific Coastwise merchant marine is faced with the problem of maintaining rates at levels competitive with railroads, and bus and truck door deliveries, in the face of mounting terminal costs—

On overseas routes the volume of trade is tremendous and is growing at a rapid rate, but competition is very keen and our national policy is uncertain—

Our shipbuilding costs are high, and are increasing, but can be offset under a liberal and firm interpretation of the most recent Merchant Marine Act.

The above is, we think, a fair appraisement of the present conditions in the Pacific-American Merchant Marine so far as these conditions can be expressed in general statements.

Granting this to be so, it would seem that before we can arrive at that much to be desired consummation we must make some changes in our merchant marine picture. We have studied this picture for many years, and it is our opinion (which we find is backed by the mature judgment of American operators of long experience) that the certain changes are imperative and should be made promptly.

We are now operating the American Merchant Marine under a Maritime Commission. The law provides that this commission shall have five members. As at present constituted, it has only three members, all appointed by the President as temporary stop gaps just before the election. None of the commissioners has had any experience with commercial shipping. Five commissioners should be promptly appointed, all selected for their commercial experience in dealing with the problems of marine transportation, and at least one of them should be from the Pacific Coast.

This commission, so constituted, should cooperate with established American shipowners to make the American Merchant Marine—coastwise, intercoastal, and overseas—serve as an efficient unit in the distribution of American Commerce under the American flag. The Maritime Commission is not constituted for the purpose of coddling shipowners nor for championing the cause of maritime labor, but for safeguarding the interests of the American people as a whole in the entire American Merchant Marine. Its policy, therefore, should be directed towards the most safe and the most economical marine transport of American citizens and American cargo.

One of the simplest ways of starting the American Merchant Marine on the road to being most safe and most economical would be to eliminate from our statute books all of the outworn and ancient laws and rules that still threaten to choke the ship operator in a collar of red tape.

Another angle for economy would be to cooperate with the shipowner in having the Panama Canal tolls reduced to a reasonable compensatory level.

A third economy measure often proposed is the elimination of government competition. The merchant marine could and should handle all peace time transport for both branches of the military service. It could and should handle the business now enjoyed by the government-owned Panama Canal Steamship Line. These eliminations could be made with profit to the national budget and with great benefit to our merchant marine.

There are a few very simple common sense actions, some of which could easily be consummated and others greatly advanced by a strong Maritime Commission cooperating with the industry.

Given cooperation of this character at Washington, the American shipowner and operator will very quickly demonstrate his ability to put on full steam ahead in the ocean trade lanes, and to get his share of the maritime commerce of the world.

Geared Turbines for New Tankers

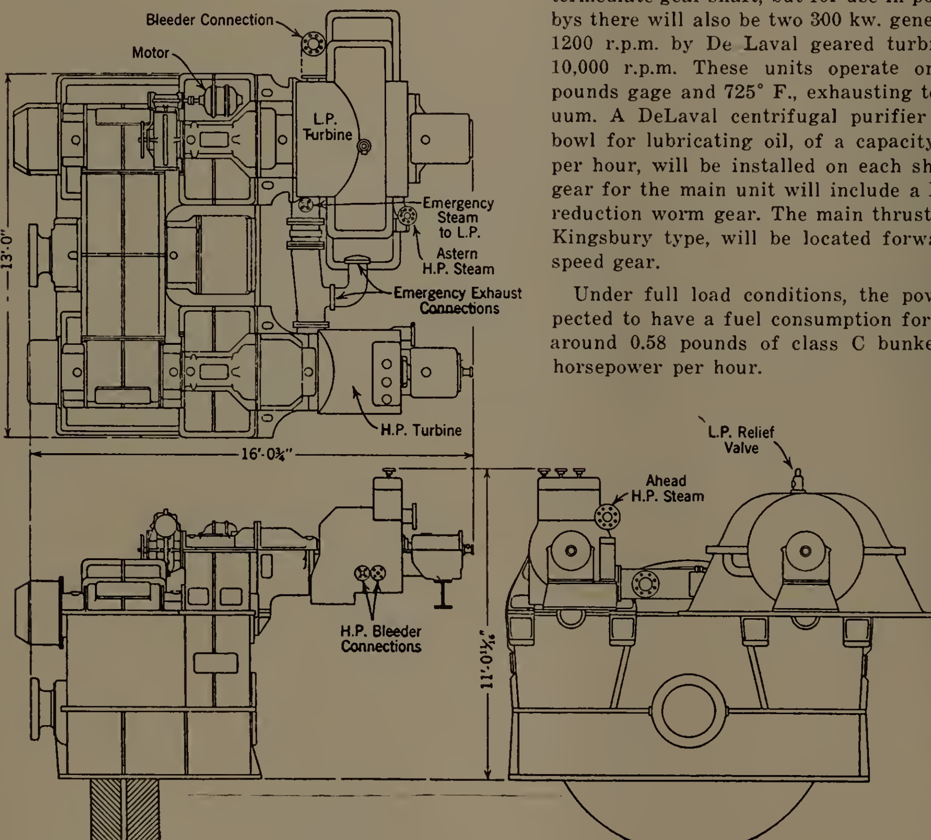
Four new tank steamers have recently been ordered from the Federal Shipbuilding & Drydock Co., Kearny, N. J., by the Standard Oil Co. of New Jersey to augment its fleet of modern steam turbine-driven bulk oil tankers. These vessels, measuring 440 feet between perpendiculars, 66½ feet beam, 34 feet 6 inches molded depth, and 28 feet draft, are to be propelled by high pressure steam equipment of the type which has proved both economical and highly reliable on the tankers G. Harrison Smith and W. S. Farish.

In each ship steam will be generated by two Foster-Wheeler boilers at a gage pressure of 400 pounds per square inch at the superheater outlet. The steam temperature at full load is to be 750° F., which is not to vary more than 15° F. at all loads between 25 per cent load and 50 per cent overload. The boilers have economizer sections, but no air heaters.

The geared turbine propelling units, which are to be built by the De Laval Steam Turbine Co., Trenton, N. J., have a normal rating of 3000 shaft horsepower at 90 r.p.m. propeller speed, and a maximum rating of 3300 horsepower at 93 r.p.m. They are of the cross compound type, with double reduction gears, and differ from the turbines of the Smith and the Farish in that the pinion speed of the high pressure turbine has been increased to 6000 r.p.m., while the low pressure turbine turns at 5000 r.p.m., both at 90 r.p.m., propeller speed. Also, the two gear reductions are to be combined in a single casing, resulting in some saving in space and weight. A vacuum of 28¼ inches is to be maintained by a Foster-Wheeler condenser. The boiler feed will be heated regeneratively in three tubular heaters, two receiving steam at 100 pounds and 35 pounds absolute pressure, respectively, at full load, from connections on the high pressure casing, and one receiving steam at 6 pounds absolute from the low pressure casing. On each ship there will be two De Laval turbine-driven two-stage centrifugal boiler feed pumps, each to deliver 65 gallons per minute against 1,160 feet head at 6000 r.p.m., with 70 pounds pressure on the suction. The boiler feed turbines exhaust to one of the feed heaters against back pressure.

At sea the motor-driven auxiliaries will receive current from a generator coupled to the low pressure intermediate gear shaft, but for use in port and as standbys there will also be two 300 kw. generators driven at 1200 r.p.m. by De Laval geared turbines running at 10,000 r.p.m. These units operate on steam at 375 pounds gage and 725° F., exhausting to 28¼ inch vacuum. A DeLaval centrifugal purifier with lead-lined bowl for lubricating oil, of a capacity of 150 gallons per hour, will be installed on each ship. The turning gear for the main unit will include a De Laval double reduction worm gear. The main thrust bearing, of the Kingsbury type, will be located forward of the slow speed gear.

Under full load conditions, the power plant is expected to have a fuel consumption for all purposes of around 0.58 pounds of class C bunker oil per shaft horsepower per hour.



Plan and side and end elevation of De Laval turbines for new tankers for the Standard Oil Co. of New Jersey.

Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

At the end of the February installment the check of the energy problem on turbines was left somewhat up in the air. Those who have been following this series will remember that we started with a pound of steam at 350 pound pressure and assumed a heat drop of 225 B. T. U. and then figured forces and velocities. Checking back from these, we abruptly stopped at 175,000 foot pounds of energy in the 1 pound of steam. We should have taken one obvious further step and divided this figure by 778 foot pounds to get 225 B. T. U., the figure with which we started.

We discussed in our last article the forces and velocities of the **reaction** turbine, in which a nozzle is pushed backward by the reaction forces of the jet, its movement resisted by the load which it drives. Obviously, this is the principle of the rocket. The reaction principle is the basis of the Parsons turbine; also that used by many other manufacturers.

In practice, however, steam is not supplied through the shaft as described for the theoretical nozzle. Instead, the pressure is dropped (steam expanded) in two equal parts, the first through a stationary nozzle immediately ahead of the moving nozzle, and the second part through the latter. The steam issuing from the

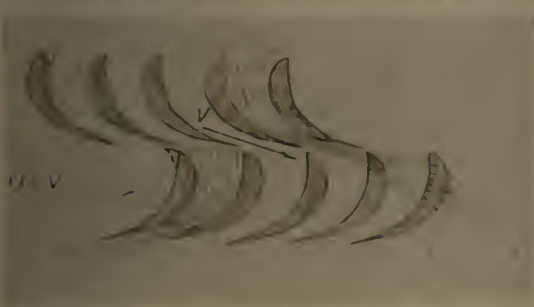


Fig. 1. Parsons, or pure reaction turbine. Stationary nozzles and moving nozzles. Jet at right indicates path of steam as viewed with respect to frame and stationary parts. Jet at left indicates path as viewed with respect to the moving nozzles. If entrance edges are shaped as shown dotted on two left hand nozzles, and velocities adjusted accordingly, the turbine has some impulsive forces, and is called the impulse-reaction type. This is the case with most modern reaction units.

Photo, courtesy Canadian Pacific S.S. Co.

Last month we published a picture of British torpedo boat Turbinia, the first seagoing steam turbine installation. Here is the S. S. Princess Patricia, formerly Queen Alexandria. Built on the Clyde by Denny Bros. in 1902, she, with her sister ship, the King Edward, was the first commercial seagoing turbine installation. She operated on the British Columbia coast for 25 years, and was broken up for scrap last month.

first and stationary nozzle will be accelerated to velocity, V, and, by allowing the second, or moving, nozzle to have a velocity V in the same direction, the steam will enter the second nozzle with no relative velocity (difference in speed of two moving objects). Thence it will again expand through the moving nozzle to a relative velocity, V, in a direction opposite to that of the moving nozzle. Thus the steam is left practically stationary in space, the condition necessary to remove all of its energy.

This combination of a stationary and moving nozzle constitutes a **reaction turbine**. By placing a series of such nozzles around the circumference of a wheel, and similar stationary nozzles in a casing ahead of the wheel, we have a workable unit.

● **Compounding or Staging**

The speed of our turbine, or wheel, and its diameter determine the velocity, V, of the nozzle.

$$V = \frac{RPM \times D \times pi}{60}$$ where V is velocity of nozzle in

feet per second, $\frac{RPM}{60}$ is revolutions per second, D is diameter of wheel in feet measured at center of nozzles, pi is a Greek letter used to represent the ratio of the circumference of a circle to its diameter; thus, circumference = pi x D = 3.1416 D.

Suppose we wanted a speed of 3000 r.p.m., then nozzle velocity would be, for a 3 foot diameter wheel,

$$V = \frac{3000 \times 3 \times 3.1416}{60} = 472 \text{ feet per second.}$$

This is much less than the velocity calculated for our theoretical nozzle under 350 lbs. per square inch steam pressure. Our only choice is to reduce the pressure, hence the difference in heat content per pound of steam, between the admission to and exhaust from the nozzle. As developed previously, $V = 223.7 \sqrt{H_1 - H_2}$ or, $H_1 - H_2 = \frac{V^2}{223.7^2}$ where V is velocity of jet issuing from a nozzle, in feet per second; H_1 is heat content per pound of steam at entrance to, and H_2 is same at exhaust from nozzle in B. T. U. per lb.

There will be approximately 10 per cent loss in velocity due to friction in nozzle, and another loss due to the angle of the issuing steam jet. The nozzle must direct the jet slightly away from the wheel to clear it. If the jet were directed along the line of motion of the nozzles it would interfere with the oncoming nozzles. Since the effective velocity is only that part or component of the actual velocity which is along the line of motion of nozzle, we must have a jet velocity in excess of the nozzle velocity. An angle of 20 degrees will adequately clear the jet from the wheel, which means that approximately 94 per cent of jet velocity is effective. Combining this with 90 per cent (10 per cent friction loss) we have .94 x .90 = .846, and theoretical velocity must be $\frac{V}{.846}$; thus $H_1 - H_2 = \frac{(472)^2}{(.846)^2} \div (223.7)^2 =$ 6.2 B. T. U.

This is equivalent to approximately 20 lbs. per square inch drop in pressure through the nozzle from our original 350. We would require a similar drop in pressure through the stationary nozzle to allow the steam to overtake the moving nozzle, or a total of only 40 lbs. per square inch for the pair. Thus we would need a good many sets of stationary and moving nozzles to drop the pressure to a low exhaust pressure. Allowing the same B. T. U. difference for each set, the corresponding pressure rapidly becomes less, so that from 25 to perhaps over 100 sets are required for different conditions.

If we were to admit the 350 lbs. per square inch pressure to a turbine exhausting at 28.5 inch vacuum, there would be approximately 400 B. T. U. available for useful work per pound of steam. Then at 6.2 B. T. U. per nozzle, or 12.4 B. T. U. per pair, we would require $\frac{400}{12.4} = 32$ sets. However, if divided into 4 or 6 or more groups, each group having larger diameter wheels to accommodate the increasing volume of steam as we reach the lower pressures, we would have higher velocities, hence higher B. T. U. differences in the lower pressure end, which would reduce the number of sets

Fig. 2: Rateau, or pure impulse turbine. Nozzles stationary. Jet velocity V. Buckets moving at velocity U. Jet shown at right indicates path of steam as viewed with respect to the stationary parts. Jet at left indicates path as viewed with respect to the moving buckets.

needed. Each group would be calculated separately. For simplicity, let us take the entire unit of 32 turbines compounded together on one shaft.

For each pound of steam per second flowing through, the force on the moving nozzle is $F = \frac{V}{32.2}$ (see last article). This is the net force, because in this turbine the kinetic energy of the steam, due to its weight moving at the velocity V just before it enters the moving nozzle, is supplied by the stationary nozzle which it has just left. Velocity, V, in direction of motion is 472 feet per second; thus reaction force is $F = \frac{472}{32.2} =$ 14.64 lbs. on the nozzle. (1)

For the 32 sets of nozzles, total force (F) is 14.64 x 32 = 468 lbs. Energy per second (E) = F x D. D is distance moved each second and equals V = 472 feet. Substituting numerical values we get E = 468 x 472 = 221,000 foot pounds each second. The heat energy available is 400 B. T. U. per second. At 778 foot pounds per B. T. U., the input = 400 x 778 = 311,200 foot pounds per second. Therefore the efficiency which is $\frac{\text{output}}{\text{input}}$ would be $\frac{221,000}{311,200} = 71$ per cent. (2) Horsepower developed $= \frac{221,000}{550} = 402$ HP for each pound of steam per second. Steam rate is usually measured in pounds of steam per HP hour. 1 hour = 3600 seconds, so the steam rate $= \frac{3600}{402} = 8.9$ lbs. per HP hour.

If we were designing a turbine for 4020 HP instead of 402 HP, we would arrange the openings in the nozzles so that they would be large enough to pass 10 times the amount of steam, i.e. 10 pounds per second, or

[1] Many nozzles on one wheel or drum will be used to pass the steam. Our one pound of steam will divide equally over them all, each having its share of this force, the total being the 14.64 lbs., just as though only one nozzle were used.

[2] This efficiency has included only friction loss in nozzles and loss due to excess velocity required because of angle of jet required to clear the following nozzles. Other losses will be radiation, windage, bearings, impact, and steam friction losses. However, since all losses return their equivalent energy to the steam as heat, they may be partially recovered in nozzles further down in pressure. This recovery or reheat factor compensates for other losses mentioned, so that the actual efficiency of the turbine may be from 65 to 75 per cent less in small units, more in larger sizes.

36,000 pounds per hour. In a later article we will show how the size of the nozzle is proportioned for a specified amount of steam.

If the turbine is standing still or just starting, with velocity of moving nozzles practically zero, the reaction force, F, on them is the same as given above, but the stationary nozzles, just ahead of them, now discharge a jet of steam at velocity V into the moving nozzles, and the impact or impulse force will also be of a value, F, so that under this condition the force on moving nozzles is 2F. If allowed to move at a velocity of 2V the reaction force will be zero, for the reason given in our previous article; hence 2V is the top, or runaway, speed.

In general we can say that the force, or turning effort (called torque) of the turbine at standstill with full steam openings will be approximately twice its normal full load, full speed, value. Torque gradually decreases to normal as speed increases to its full or normal value, and torque further decreases to zero as speed increases beyond normal and approaches twice normal.

● **Impulsive forces**

As stated before, the principal object in designing our moving element is to bring the velocity of the jet to zero, or as close to this as possible, thus removing its kinetic energy, transforming it to mechanical energy. There is another method of accomplishing this, other than allowing the nozzle to move at the velocity of the jet. This other method is called the impulse principle.

If we use a stationary nozzle as before, directing a jet of steam at velocity, V, the moving element, we would have, so far, the same arrangement as for the reaction principle. But, instead of having nozzles on the moving element, we have vanes or curved surfaces to intercept the jet and redirect it backward, and, further, have enough space between these vanes, sometimes called buckets, to pass all the steam necessary without any restriction, hence no pressure drop in passing, we will have an impulsive force on these vanes due to the force of the jet, and to the redirection of it backward.

Furthermore, if we allow the velocity of the vanes, U, to be one-half of velocity of jet, $U = \frac{V}{2}$; the jet will be practically stationary after leaving the vanes.

To illustrate this, suppose that we have a coiled rope on the deck, and pass one end through a single part block, then secure this end to the deck. Now move the block along the deck a distance of 10 feet. You will find that 20 feet of the rope has paid out. In like manner move the block at a velocity, U, 3 feet per second. The rope will pay out at a velocity, V, of 6 feet per second. But no matter what velocities we choose, as long as $U = \frac{V}{2}$ the rope leaving the block is stationary and lies motionless on the deck. If we now change the rope into a jet of steam directed against a moving curved surface forcing it backward, and adjust the velocity, U, of the surface, or bucket, to one-half of velocity, V, of the jet, it too will leave the bucket and be stationary in space.

Since the jet is decelerated or slowed down from velocity, V, to practically zero, the impulsive force as before will be $F = \frac{V}{32.2}$ when V is velocity of jet in feet per second; F is force in pounds for 1 pound of steam per second. Energy transformed would be $E = F \times D$ when E is foot pounds of work done each second, F is impulsive force in pounds, D is distance covered by bucket in 1 second; then since $D = U$ and $U = \frac{V}{2}$, $E = \frac{V}{32.2} \times \frac{V}{2} = \frac{V^2}{32.2 \times 2}$

This is apparently one-half of the amount recovered from the reactive jet, because bucket moves one-half velocity of reaction nozzle with the same force. However, we must remember that to get the force F and velocity V on the reactive nozzle we had to have another and stationary nozzle ahead of it to accelerate steam to velocity, V, so that it could enter the nozzle without impact or confusion. This took twice the heat drop $(H_1 - H_2)$; i. e. both the stationary and the moving nozzle each took a heat drop and each imparted the velocity, V, to a jet to get the force F and convert the energy, E.

Thus, for the same heat drop, the impulse principle gives higher velocity of jet, lower velocity of bucket or moving element, correspondingly higher force, and the same energy conversion.

Let us take the same 400 B. T. U. heat drop and convert it in an impulse turbine, using same speed and diameter of wheels.

Bucket velocity $U = 472$ feet per second. $V = 2U = 944$ feet per second effective jet velocity. Using same losses due to friction and angle of entrance and exit, we have: $H_1 - H_2 = \frac{(944)^2}{(.846)^2} \div (223.7)^2 = 24.8$ B. T. U. each set.

$\frac{400}{24.8} = 16.1$ or 16 sets of nozzles and buckets.

Force, $F, = \frac{V}{32.2} = \frac{944}{32.2} = 24.28$ lbs. per set.

Total force $= 16 \times 24.28 = 468$ lbs. Same total force as with reaction turbine. $E = 468 \times 472 = 221{,}000$ foot lbs. each second, same as other turbine. Hence, HP and efficiency will also be the same.

These two illustrations of turbine design are extremely elementary, leaving out many refinements, which will be discussed in later articles.

The terms nozzle, bucket, vane, and blade are frequently used without correct distinction. Here we use the word nozzle to mean an opening through which steam passes, having two decided differences from buckets, vanes, or blades. They are:

(1) The area of the opening is restricted with respect to the volume of steam passing, hence steam is forced through it by a pressure difference between the entrance and exit. Except for a few cases of first stage nozzles on small units, the exit area is reduced and less than the entrance area.

(2) There is a pressure drop from the entrance to the exit, hence they must be designed to withstand the pressure difference. This is an important distinction with the moving nozzles.

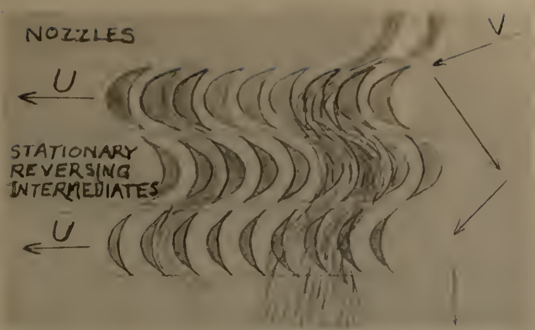


Fig. 3: Curtis, or velocity compounded impulse turbine. Nearly all turbines use this principle in the first stage and reversing section. Jet at right indicates flow of steam as viewed with respect to frame or fixed parts. Jet at left as viewed with respect to moving buckets.

The term buckets is generally used to apply to the moving curved surfaces of turbines using the impulse principle, which is sometimes called the Rateau principle, after the inventor. These turbines will also have stationary buckets when velocity compounding is employed after the Curtis principle. No pressure drop exists between entrance and exit opening. The areas of openings are more than enough to pass all the steam admitted to them.

The terms vanes or blades are usually associated with the curved surfaces, moving or stationary, in the Parsons or reaction turbine. By placing them close together and directing the leaving edge back and closing it up to the adjacent vane, the two vanes constitute a nozzle, necessary for this type of turbine.

The reader is encouraged to refer to the many textbooks and technical publications on the subject and study the figures and illustrations, comparing with the foregoing general discussion. Also compare this with your general observations of the interior of steam turbines. The accompanying figures show the basic principles involved in all modern steam turbines.

Figure 3 shows the velocity compounded, Curtis, arrangement of buckets. Hence the velocity V may be as much as four times the bucket velocity U, and is reduced to approximately zero in two steps, the first half removed in first row of moving buckets; then after being reversed in direction in the stationary intermediates, the other half is removed in the second row of moving buckets.

Some of the smaller turbines, used for auxiliaries, apply the re-entrant principle, in which the velocity V is 4 or more times the bucket velocity U. The jet, after leaving moving buckets with nearly half its original velocity, is redirected by suitable channels back onto the same row of moving buckets, passing through them in the opposite direction, giving up nearly all its velocity.

Another form of re-entrant principle is to cause the jet to whirl in a spiral, making from 2 or 3 to perhaps 6 or 8 complete turns of the spiral. The directing surfaces are one-half in a moving wheel, and one half in a stationary casing. The same jet striking the same slotted wheel several times causes it to move under the impulse forces.

Our next article will discuss how much steam flows through nozzles, how they should be proportioned, and how the HP and size of turbines are determined.

Licensed Officers Promotions

The following list of American licensed officers for coastwise and ocean services has been approved by Pacific Coast offices of the U. S. Marine Inspection and Navigation Bureau for renewal of license or raise in grade during December, 1936, and January, 1937. For abbreviations see footnote.

Name	Grade	Class	Condition
ALASKA			
John S. Swanson	Master	OSS&MS, any GT	OG
Jose Antonio Suarez	2nd asst. eng.	OSS, any GT	OG
SEATTLE			
George E. Carlson	Master	OSS, any GT	RG
Hans Amdal	Master	OSS, any GT	RG
John L. Sloan	Chief mate	OSS, any GT	RG
George E. Ritter	Second mate	OSS, any GT	RG
Henry R. Sterner	Second mate	OSS, any GT	RG
Rueben Jacobsen	Second mate	OSS, any GT	RG
Philip W. Corser	Third Mate	OSS, any GT	OG
Raymond P. Dowling	Third Mate	OSS, any GT	OG
Carl O. Angvik	Third Mate	OSS, any GT	OG
John A. Conroy	Third Mate	OSS, any GT	OG
Ray L. Zimmerman	First asst. eng.	OSS, any GT	RG
Morris Rambeau	Third asst. eng.	OSS, any GT	OG
Charles C. Croft	Chief eng.	OMS, any GT	OG
John B. Wilson	Chief eng.	OMS, any GT	OG
Ellis P. Thomas	Master	OSS, any GT	RG
Glenn E. Whaley	Master & Pilot	OSS, any GT	RG
Lewis V. Beaulieu	Chief mate	OSS, any GT	RG
Archie M. Simenstad	Chief mate	OSS, any GT	RG
Barney W. Hansen	Ch. mate & pilot	OSS, any GT	RG
Luke Edwards	Second mate	OSS, any GT	RG
Arnold B. Castle	Third mate	OSS, any GT	OG
James N. Davitt	First asst. eng.	OSS, any GT	RG
Bryant W. Godfrey	First asst. eng.	OSS, any GT	RG
Jack B. Rosenvold	Third asst. eng.	OSS, any GT	OG
William Carlson	Chief eng.	OMS, any GT	OG
PORTLAND			
Ralph H. Compton	Master	OSS, any GT	RG
Dael P. Baird	Chief mate	OSS, any GT	RG
George Jessen	Chief mate	OSS, any GT	RG
Edward E. Cloney	Third mate	OSS, any GT	OG
Adolph J. Ederer	Chief eng.	OSS, any GT	RG
Ed Jenkins	Chief eng.	OSS, any GT	RG
Jack Marple	Chief eng.	OSS, any GT	RG
Elbert E. Hawkins	1st asst. eng.	OSS, any GT	RG
John E. Myers	1st asst. eng.	OSS, any GT	RG
Byron T. Walker	1st asst. eng.	OSS, any GT	RG
Frank F. Follett	2nd asst. eng.	OSS, any GT	RG
Marlin Karney	2nd asst. eng.	OSS, any GT	RG
George W. Miller	2nd asst. eng.	OSS, any GT	OG
Philip S. Morgan	3rd asst. eng.	OSS, any GT	OG
Dixie W. Williams	3rd asst. eng.	OSS, any GT	OG
Julius Richter	Chief mate	OSS, any GT	RG
Theodore Idzal	Chief mate	OSS, any GT	RG

John E. Abbott	Chief eng.	OSS, any GT	RG
John Leo Kells	Chief eng.	OSS, any GT	RG
Carl A. Green	2nd asst. eng.	OSS, any GT	RG
William C. Kotkas	2nd asst. eng.	OSS, 750 GT	OG
	3rd asst. eng.	OSS, any GT	
Carl M. Clausen	1st. asst. eng.	OMS, 500 GT	OG
	1st asst. eng.	OMS, 750 GT	

SAN FRANCISCO

[illegible] J Fulton	Master	OSS, any GT	RG
George F Hudson	Master	OSS, any GT	RG
Erwin H Nelson	Master	OSS, any GT	RG
Bert O Nelson	Master	OSS, any GT	RG
Murdock D MacRae	Master & pilot	OSS, any GT	RG
George L. Mollison	Master & pilot	OSS, any GT	RG
Karl H Moden	Master & pilot	OSS, any GT	RG
John W Fisher	Master	Coastwise SS, any GT	OG
Ralph C Weymouth	Chief mate	OSS, any GT	RG
Charles L. Neill	Chief mate	OSS, any GT	RG
Gosta A Bjork	Ch. mate & pilot	OSS, any GT	RG
Rene A Chesselet	2nd mate	OSS, any GT	RG
Warner W Wagener	2nd mate	OSS, any GT	RG
Karl E. Katlas	2nd mate	OSS, any GT	OG
James L. Reid	2nd mate	OSS, any GT	RG
Ernest C Fisher	2nd mate	OSS, any GT	RG
Luther O Millican	2nd mate	OSS, any GT	OG
Harold S Diefendorf	2nd mate	OSS, any GT	OG
Joseph Fox, Jr.	2nd mate	OSS, any GT	RG
Marcel Rionsse	2nd mate	OSS, any GT	RG
Warren F. Douglas	3rd mate	OSS, any GT	OG
John R. Sarrins	3rd mate	OSS, any GT	OG
Clennon A. Kemp	3rd mate	OSS, any GT	OG
Eugene D. Percy	Chief eng.	OSS, any GT	RG
Jack Taylor	Chief eng.	OSS, any GT	RG
William F. Usher	Chief eng.	OSS, any GT	RG
Darrel M. Gibson	Chief eng.	OSS, any GT	RG
Leo M Sullivan	Chief eng.	OSS, any GT	RG
Albert Heflin	Chief eng.	OSS, any GT	RG
William C. Thompson	Chief eng.	OSS, any GT	RG
Frank J Russell	Chief eng.	OSS, any GT	RG
A Francois Wickel	1st asst. eng.	OSS, any GT	RG
William L. Jamieson	1st asst. eng.	OSS, any GT	RG
Donald McQ. George	1st asst. eng.	OSS, any GT	RG
Alexander S. Perron	1st asst. eng.	OSS, any GT	RG
Robt Greg Burrous	2nd asst. eng.	OSS, any GT	RG
Curtis R Johnson	2nd asst. eng.	OSS, any GT	OG
Horace A Berry	2nd asst. eng.	OSS, any GT	RG
James R Atherton	2nd asst eng.	OSS, any GT	RG
Roy Tuttle	2nd asst. eng.	OSS, any GT	OG
William Hornberger	2nd asst. eng.	OSS, any GT	RG
Jerry Alsman	2nd asst eng.	OSS, any GT	OG
Richmond Barker	2nd asst. eng.	OSS, any GT	RG
Herbert F. Kenyon	3rd asst. eng.	OSS, any GT	OG
Edmund Kemp	3rd asst. eng.	OSS, any GT	OG
Werner Burman	3rd asst. eng.	OSS, any GT	OG
George S. Cronk	3rd asst eng.	OSS, any GT	OG
Harry E. Morgan	3rd asst. eng.	OSS, any GT	OG
Albert H Cockerill	Chief eng.	OMS, any GT	OG
A. Francois Wickel	Chief eng.	OMS, any GT	OG
Maximilian Goin	Chief eng.	OMS, any GT	OG
Basil Limneos	Chief eng.	OMS, any GT	OG
Lawrence Zeiser	1st asst. eng.	OMS, any GT	RG
Leslie F Leghorn	3rd asst. eng.	OMS, any GT	OG
Robert B. O'Brien	Master	OSS, any GT	RG
Frank G Peterson	Master & Pilot	OSS, any GT	RG
William C. Ash	Chief mate	OSS, any GT	RG
Fred Herick	Chief mate	OSS, any GT	RG
Andrew W. Haslam	Chief mate	OSS, any GT	RG
Carl R West	Chief mate	OSS, any GT	RG
Nils J Carlson	Chief mate	OSS, any GT	RG
Emil E. Peterson	2nd mate	OSS, any GT	OG
Matthew C. Sullivan	2nd mate	OSS, any GT	OG
Henrik E. Sievers	2nd mate	OSS, any GT	RG
Leon R. Dupuich	3rd mate	OSS, any GT	OG
Albert R Hesch	3rd mate	OSS, any GT	OG
Vincent T. Simpson	3rd mate	OSS, any GT	OG
Robert R. Masters	3rd mate	OSS, any GT	OG
Charles W. Caley	3rd mate	OSS, any GT	OG
Guy F. Christian	1st asst. eng.	OSS, any GT	RG
Andrew E Weller	1st asst. eng.	OSS, any GT	RG
Rufus B Lane	1st asst. eng.	OSS, any GT	RG
Wallace W. Herne	1st asst. eng.	OSS, any GT	RG
Ralph E. Reid	2nd asst. eng.	OSS, any GT	OG
Michael L. Dolan	2nd asst. eng.	OSS, any GT	RG
Jesse B. Herron	2nd asst eng.	OSS, any GT	RG
Justus J. van Loben Sels, Jr	2nd asst eng.	OSS, any GT	RG
Donald P. Hanrahan	3rd asst. eng.	OSS, any GT	OG
Charles L. Stone	3rd asst. eng.	OSS, any GT	OG
Michael McCormick	3rd asst. eng.	OSS, any GT	OG
Ray J. Sauer	3rd asst. eng.	OSS, any GT	OG
Chan Lyman	3rd asst. eng.	OSS, any GT	OG
Robert A. Mills	Chief eng.	OMS, any GT	OG
Robert Elliott	2nd asst. eng.	OMS, any GT	OG

LOS ANGELES

Edward F. Carter	Master	OSS, any GT	RG
Charles L. Kiewert	Chief mate	OSS, any GT	RG
Nathaniel Mann II	2nd mate	OSS, any GT	RG
Donn Shippee	2nd mate	OSS, any GT	OG
Sigurd A. Ougland	2nd mate	OSS, any GT	RG
Joseph Grant	Chief mate	OSS, any GT	RG
Arthur C. Modell	Chief eng.	OMS, 1500 GT	OG
Brian T. Rolfe	2nd asst. eng.	OSS, any GT	RG
William R. Adamson	3rd asst. eng.	OSS, any GT	OG
Edward M. Zimmer	1st asst. eng.	OSS, any GT	OG
Carl R. Hower	2nd asst. eng.	OSS, any GT	RG
William M. Chivas	3rd asst. eng.	OSS, any GT	OG
Arnold H. Moody	Chief eng.	OSS, any GT	RG
Stephen M. Seledee	2nd mate	OSS, any GT	RG
Arthur V. Hollinger	Chief eng.	OSS, any GT	RG

HONOLULU

George R. Miller	Master	OSS, any GT	RG
James A. Crosland	Master	OSS, any GT	RG
Wilmer F. Lewis	2nd mate	OSS, any GT	RG
Albert M. Hussey	2nd asst. eng.	OSS, any GT	RG
John van der Dussen	1st asst. eng.	OSS, any GT	RG
Morris E. English	Ch. mate & pilot	OSS, any GT	RG
Edward T. Collins	Ch. mate & pilot	OSS, any GT	RG
Richard T. Ferguson	2nd asst. eng.	OSS, any GT	RG
Charles K. Makalo	3rd asst. eng.	OSS, 3500 GT	OG
Burr W. Cannam	2nd asst. eng.	OSS, any GT	RG

Abbreviations: GT is gross tonnage, RG is raised grade; OG is renewal of original grade; OSS is ocean steamer; OMS is ocean motorship

Executive Committee for Marine Safety

At the annual meeting of the Pacific Coast Marine Associations' Executive Safety Committee held at San Francisco on Wednesday, February 3, 1937, Captain N. J. Kane, of the American Hawaiian Steamship Company, was elected chairman to succeed Capt. F. M. Edwards, deceased.

Captain J. G. Ludlow, of the California Stevedore & Ballast Company, was elected vice-chairman.

B. O. Pickard, manager, Accident Prevention Bureau, was elected secretary.

H. M. Kelly, of the Dollar Steamship Lines, was elected to the position of chairman of the Finance Committee.

Other committee chairmen are:

Ralph W. Myers, Hobbs, Wall & Company, Legislative Committee;

Captain W. T. Lion, Swayne & Hoyt, Ltd., Publications and Poster Committee;

E. H. Harms, McCormick Steamship Company, Publicity and Contest Committee;

I. Scott, Matson Navigation Company, Educational Program Committee.

A-B-C of Air Conditioning

By Berry E. Dunn

Air conditioning may be defined as the process by which an adequate supply of ventilating air is controlled as to temperature and humidity. In the majority of locations in the United States air conditioning requires cooling equipment in summer, heating equipment in winter, humidity control equipment and ventilating equipment the year round.

The Air Conditioning Manufacturers Association recently issued figures showing that $35,000,000 had been spent on air conditioning in the United States in 1935, which was an increase of 80 per cent as compared with 1934. The figures for 1936 are much larger than those for 1935.

Since nearly all buildings in the United States have some form of heating plant, the great majority of the air conditioning installations made in the past, or to be made in the near future, will involve cooling and control of humidity. New buildings, however, will more and more be designed for complete year round air conditioning. Then it will be unnecessary to open windows and allow germs, dirt, and outside noises to invade our offices, shops, places of amusement, hospitals, or dwellings.

There are great differences in local conditions both summer and winter, so that each air conditioning installation is almost a special engineering problem if we are to get ideal results. Thus, in districts which have a high humidity in summer, it is considered unwise to lower the temperature more than 15 degrees, while in dry, hot climates the temperature can be brought down 20 degrees or more. Ninety degrees in seaport towns, with the air full of moisture, feels more uncomfortably hot to most people than 115 degrees in some dry interior city. In air of high humidity at 90 degrees there is practically no evaporation of perspiration, and the body heat is not absorbed into the air. In the dry air at 115 degrees the perspiration is immediately evaporated, and this evaporation absorbs a lot of body heat and so has a cooling effect. This cooling effect has been measured, and we know that for each pound of water evaporated at atmospheric pressure and at 70 degrees temperature, the heat energy absorbed by the latent heat of the water vapor passing into the air is 1055 British Thermal Units.

Humidity is usually expressed as relative humidity, which means the ratio of the moisture actually in the air compared to the moisture that air could hold if saturated at the existing temperature. Standard tables of Properties of Air give the amount of moisture that air will hold at 100 per cent R. H. (saturation) for each degree of temperature. There is always a definite relationship between the temperature and the moisture content of air, and the temperature that air assumes at the saturation point is known as the dew point. Dry bulb temperature (D. B.) is the temperature reading obtained by the ordinary mercury thermometer. Wet bulb temperature (W. B.) may be obtained with the same thermometer by wrapping a piece of wet cotton cloth around the bulb and swinging the thermometer in the air with a rapid motion.

Thus, if we have air with a temperature of 84 degrees D. B. and 50 per cent R. H., we would get a wet bulb reading of 70 degrees. Now, if we put this air through an air washer so that it has 100 per cent R. H., the thermometer would read 70 per cent D. B., and the same on the wet bulb. We have lowered the temperature of the air by 14 degrees, and anyone going into a room full of this air would immediately feel cooled off. However, we have increased the relative humidity, and so there is a greater amount of the latent heat of water vapor in the air in the room, and that would have the effect of causing an uncomfortable feeling of clamminess after one had sat in that atmosphere for a few moments. This is the reason that the air washing system of air conditioning is unsatisfactory in many installations.

By using refrigeration the dew point may be either maintained or lowered while lowering the dry bulb temperature.

● **Calculating Cooling Loads**

Lowering the air temperature is called sensible heat cooling. Lowering the dew point is called latent heat cooling.

Specific heat of air...0.241
Weight of air (pounds per cubic foot) 0.075
Latent heat released by condensing or absorbed in evaporating one pound of water vapor in the air equals in British Thermal Units 1055.

Assume an installation with a fan capacity 10,000 cubic feet per minute taking air at 100 degrees D. B., 46 per cent R. H., and a dew point of 76 degrees. What refrigeration capacity will be required to insure this quantity of air being delivered at 80 degrees D. B. and 50 per cent R. H., or 60 degrees dew point?

Air at 76 degrees dew point contains 9.76 grains of moisture per cubic foot.

Air at 60 degrees dew point contains 5.80 grains of moisture per cubic foot.

7,000 grains equals 1 pound avoirdupois. The latent heat cooling capacity required would therefore be:

$$\frac{(9.76 - 5.80) \times 10000 \times 1055}{7000} = 5969 \text{ B. T. U.}$$

And the sensible heat cooling capacity required would be:

$(100^\circ - 80^\circ \times 0.241 \times 10000 \times 0.075 = 3615$ B. T. U.

To these would have to be added the small amount necessary to cool the condensed moisture from 76 degrees to 60 degrees, which in this case would be 91 B. T. U. Thus we arrive at a total refrigerating capacity of 9675 B. T. U. per minute. Since the A. S. R. E. standard ton capacity rating is the equivalent of 200

B. T. U. per minute, it is evident that we need for our problem a refrigerating capacity of 48.37 tons.

The constants assumed in this calculation are in reality all variables, and for the conditions assumed in this problem, if the exact values were used, we would find we needed a total refrigeration capacity of 9832 B. T. U. per minute, or 49.16 tons. However, the theoretical load is always much lower than the actual requirement and so this difference of less than 2 per cent is negligible in a preliminary calculation.

● Practical Considerations

When making up an estimate of the heat load in a space that is to be air conditioned, everything in and surrounding that space must be taken into consideration. Such factors as: the effect of outside heat or cold windows, the absorption or reflecting effect of the materials composing walls, ceilings, and floors; the space occupied, and the various disturbances to circulation set up, by equipment, furnishings, machinery, or any other objects within the space; and the effect of the persons normally occupying the space. Each installation is different, and must be thoroughly investigated before the heat load can be intelligently calculated.

Recirculation of air in the space (only allowing sufficient outside air to prevent vitiation of the inside air) will, of course, greatly reduce refrigeration loads. Under certain conditions this saving may be very great. One example shows that by recirculating 75 per cent of the air there would be a 60 per cent reduction in the refrigerator load.

The amount of air to be circulated depends upon the purpose for which the conditioned space is to be used. This air must be properly introduced into the space. If not enough air is circulated for the heat load, then the temperature will rise above the designed room temperature. If the fan capacity is low compared to the refrigeration capacity, then the entering air will be too low in temperature and people will complain of drafts.

The proper amount of air should enter the room at 5 or 6° below the designed room temperature. Under this condition six to ten air changes an hour should give good results. In a theater where the heat load is mostly from people, the circulating fan capacity should be from 25 to 30 c.f.m. per person, and 6 to 8 cubic feet of fresh air per minute per person should be allowed.

To avoid drafts it is very necessary that the proper amount of air be circulated and discharged into the room at a low velocity. In order to get low entering velocity (300 to 400 feet per min.), and also proper distribution in cargo spaces it is necessary to use a duct system. In small rooms one supply and one return opening will usually take care of the conditions.

If there is much smoking or odor from cooking, it is necessary to introduce 15 to 20 c.f.m. of fresh air per person.

People at rest, and in a theater, will emit approximately 400 B.T.U. per hour, 300 of which is sensible and 100 is latent heat. A person will emit about 700 grains of moisture per hour and

$$\frac{7000 \text{ gr. per lb.}}{700 \times 1055} \quad 105 \text{ B.T.U.}$$

per hour latent heat.

The heat emitted per hour for men at work will range from 600 to 1300 B.T.U. per hour, depending upon the rate of work. It is reasonable to assume that with an increase of temperature there is a decrease in emission of sensible heat, and, there being a greater degree of perspiration, there will be an increase in latent heat emitted. Emission of sensible heat becomes zero when room temperature equals the body temperature, and emission of latent heat becomes zero when the room temperature is around 60 degrees and the men are at rest. Under the above conditions, the sensible heat emission will be greater at low temperatures and the latent heat emission will be greater at higher temperatures.

In comfort cooling installations, the control of the relative humidity is not so important as the control of the dry bulb temperature; the relative humidity can vary 10 per cent and no one would complain. Finned type or extended surface coils are largely used for air cooling purposes, and there is no absolute control of humidity with this type coil.

If the refrigeration installation is large for the load, the compressor will work at lower suction temperature than needed, the refrigeration be colder and the dew point lower. The reverse is true if the refrigerating equipment is under size.

For control of relative humidity in industrial plants, or when humidity is more important than dry bulb temperature, it is customary to use an air washer, the temperature of the water governing the dew point temperature, the air being heated to give the required dry bulb temperature for the relative humidity needed in the conditioned space.

With the use of an air washer considerably more refrigeration effect is required, as all the air is lowered to the dew point temperature, assuming the washer is 100 per cent efficient. One example shows that the air washer requires 20 per cent more refrigeration than the finned coil method for the same air conditioning specifications.

● Cooling Methods.

There are several methods for cooling the air in use at the present time, the principal one being by means of a refrigeration compressor. By this system the compressor is designed to maintain a refrigerant temperature in the coils of about 45°; to cool water to about 40° and circulate this water through the coils; or to cool water to about 52° and circulate this water through an air washer. The first method is used in the great majority of modern installations.

Air cooling can also be obtained by spraying water over blocks of ice and using the cold water in the same manner as above. The use of ice has advantages, in that the first cost of installation is less than the use of refrigerating equipment. However, unless ice can be obtained at a very low price per ton, the operating cost will be excessive. A ton of refrigeration, which is equal to the melting effect of a ton of ice, can be purchased for less money than a ton of ice, unless the ice manufacturer sells the ice for less than his cost. An air conditioning installation requiring refrigeration at the rate of 10 tons in 24 hours would require 833 pounds of ice per hour to do the same amount of work.

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Strength of Purse Seiners

By David W. Dickie

Some of the purse seiners have put into port in a leaking condition, and this investigation discloses that some of the boats that have gone ashore may have been beached for the same reason. This is probably the first time in the history of shipbuilding that the accompanying curves have been made for a wooden vessel.

The Curve of Weights is made by taking the various weights of the boat, such as machinery and equipment, and plotting them on a straight line in the relative position they occupy on the boat, so the height from the base line to the curve represents the weight per foot of the completed boat at any particular point.

The ordinate of the curve of buoyancy represents the displacement in pounds per foot of the boat at any selected point.

The Curve of Loads is the difference between the Curve of Buoyancy and the Curve of Weights, and is plotted so the ordinate of the curve represents the amount the buoyancy or weight is in excess. Obviously, where the stern is overhung without any support from the water, the weight is in excess, and this weight has to be supported by an excess of buoyancy in another place.

The Curve of Shearing Forces is the integration of the Curve of Loads, and the Curve of Bending Moments is the integration of the Curve of Shearing Forces.

In wooden vessels we are not much concerned with the bending moments, except where the bending tends to distort the form of the boat. There is usually ample wood in such boats to take care of the bending, but the necessary strength to take care of the distortion of the cross section is inadequate in practically all of them. This was discussed in the August number of Pacific Marine Review.

The trouble with all wooden ships that have not been carefully designed is shown by the Shearing Force Curve.

Figure 2 shows one timber on top of another bent as the distribution of weights tends to bend the boat when floating in still water with the machinery, anchor windlass, fuel and water tanks in the forward end and the net table, net, seine boat, and fuel tanks at the other. The underwater shape of the bow and stern of any boat precludes any great amount of support for the weights above, and such excess weights have to be supported by the displacement of the larger middle part of the hull. Let us assume that the top timber of Fig. 2 represents the deck construction and the lower one the keel, keelsons and fore and aft strength members below. Between these timbers are placed some blocks to represent the construction of the hull between the top and bottom construction.

To compare the bending of the timbers in Fig. 2 with that of the boat, we bend them over two points of support placed where the shearing force curve is at its greatest distance from the base line either up or down, known as the maximum points of Shearing Forces.

The top and bottom timbers being the same length before bending, it will be found that the lower one will extend beyond the upper one when bent. This tends to roll the blocks between them, giving a graphic illustration of the shearing forces represented by the shearing force curve of Fig. 1. To overcome the shearing forces in a ship the strength members should be edge fastened together. If a ship is bent beyond the strength of the edge fastening, the bolt holes in the wood become oval and the edge fastening loses all value to resist the initial shearing forces set up. The ship will continue to hold together, but the movement between the edges of the planking destroys the caulking, and the boats leak.

An investigation showed that the boats that have come in leaking have been inadequately fastened. One boat had only two bolts holding the sternpost in place. The American Bureau of Shipping Rules require eight bolts to fasten the particular member as it was framed. It will be noticed from the curve that the greatest shearing forces are found in the way of the after deadwood and sternpost. Also maximum shearing forces are found at the after end of the engine, which accounts for all of the trouble with the bearing on the after engine room bulkhead.

The bolts taken out of the after deadwood of another boat were eaten away from ⅞ inch original diameter to ⅜ inch diameter at one place where the bolts crossed from one piece of deadwood to the next and ¼ inch diameter at the other crossing. The deadwood had been moving—the caulking leaked—and the salt water attacked the bolts at the point where the caulking failed. The American Bureau Rules called for five times the number of bolts that were in this deadwood. The bolt shown is also eaten away at one place in the center of the lower timber, but this was caused by a check in the wood letting the salt water reach the bolt when the caulking failed, and has no bearing on the problem.

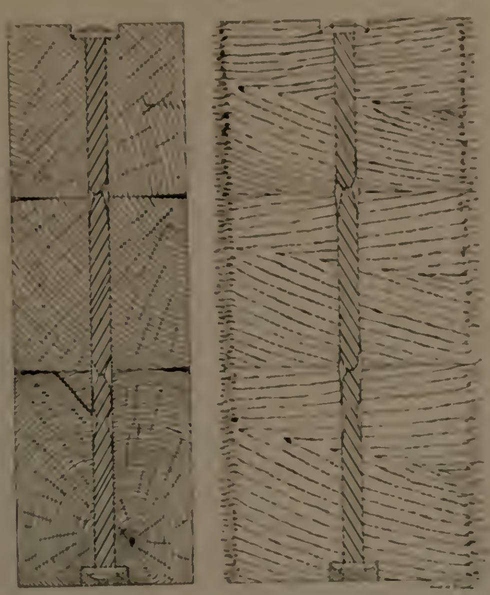
The above bolts were driven through a heavy washer at one end and clinched over a similar washer at the other, so there is no criticism of the workmanship. The wood on the forward and after sides of the bolts was compressed so the holes were elliptical ⅞ inch across the grain and 1 inch in the direction of the grain of the wood where the faying surfaces came together. In the center of the timbers the bolts were so tight in the holes the wood had to be split to get the bolts out.

The leaking due to improper fastening must not be confused with the entry of water to the interior of the boat through the piping. The centrifugal pump that pumps the fish hold has a priming connection to the

sea. On the same system is a connection to the bilge in the engine room. When the bilge check valve gets clogged with dirt the fishermen take the check out of the valve so there is no barrier between the sea and the engine room.

If the piping is to be so arranged, the only remedy is to carry the stems of the valves up to the deck with emergency wheels on deck to shut the valves off in case the engine room is flooded above the valve wheels there.

FIG 3



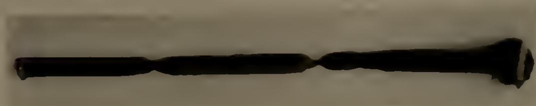


FIG 1

FIG 2

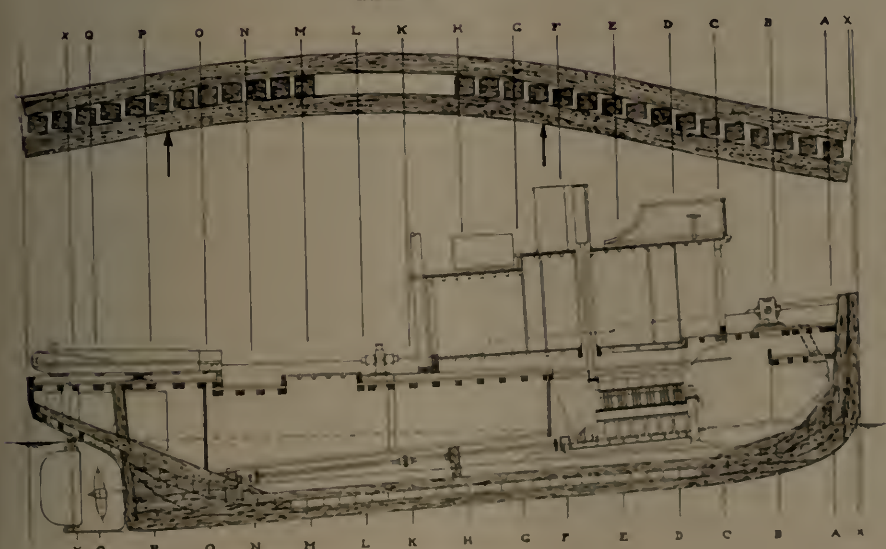


Fig. 1 shows, from bottom up, curve of weights, curve of buoyancy, curve of shearing forces, curve of loads, curve of bending moments, for purse seiner represented by Fig. 2.

Fig. 3 is drawing showing deadwood timbers fastened by bolt.

Below Fig. 3 is a cut made from a photograph of the bolt.

Forty Years of

Admiralty Tubes in Ocean Going Surface Condensers

U. S. Battleship Oregon.

In 1896 the Union Iron Works, of San Francisco, were building the battleship Oregon for the United States Navy. At that time and for some years previously the United States Navy Department were trying to modernize the American naval fleet, and since no modern steel war vessels had been built in U.S. shipyards, and no American precedents were available, the department purchased plans and specifications from British naval architects and shipbuilders. British naval specifications then as now called for the Admiralty mixture of 70 per cent copper, 1 per cent tin, and 29 per cent zinc for condenser tubes. The commercial condenser tube formulae then in vogue specified from 60 to 70 per cent copper, a trace of lead and iron, and the remainder zinc.

In 1896 Bridgeport Brass Company, of Bridgeport, Connecticut, became the first American manufacturer to produce condenser tubes of the standard British Admiralty mixture. One of their first customers was the Union Iron Works, of San Francisco, and the first shipment of these tubes to the Pacific Coast was used to tube the condensers of the famous U. S. battleship Oregon. This vessel was completed on July 7, 1896, held successful trials, on which her engines developed over 11,000 I.H.P., and drove her 10,288 tons of hull through the waters of Santa Barbara Channel at 16.76 knots. Commissioned early in 1897, the Oregon at the outbreak of the Spanish-American War was ordered to proceed at full speed forced draft from Puget Sound round the Horn to Santiago, Cuba.

At that time nothing approaching this 15,000 mile run had ever been known in naval history. The machinery in the Oregon functioned perfectly, and she arrived at Santiago, Cuba, ready to go into that famous battle with unimpaired speed and with her fighting mechanism in perfect order. A large part of the credit due in this remarkable performance goes to the Bridgeport Admiralty Tubes in her condensers.

This very auspicious introduction of Admiralty mixture condenser tubes gave the Bridgeport Brass Company great prestige in Pacific Coast marine circles. From its service record in naval ships the Admiralty mixture tube gradually spread out into the merchant marine and into shoreside power plants.

The Engineering Department of the Bridgeport Brass Company carried out considerable research to improve this product. Admiralty condenser tubes were at first delivered to the navy and the merchant marine in the hard drawn condition. This led to some season cracking of tubes in service and to a recommendation from the Engineering Department that all Admiralty condenser tubes be annealed lightly after the final hard drawing operation. This precaution was adopted and provided for in U. S. Navy specifications, and is standard practice with American tube manufacturers today for all hard drawn condenser tubing.

During their forty years of contact with Pacific seagoing condensers the engineers of Bridgeport Brass have solved many problems, and, in cooperation with Pacific merchant marine engine room staff and operating management, they have developed many useful ideas as to condenser management and condenser tube technique.

That these services have been and are appreciated is shown by the wide use of Bridgeport Admiralty condenser tubes in the surface condensers of the steamers of principal intercoastal steamship lines based on and serving Pacific Coast ports. Bridgeport tubes of Admiralty mixture and other alloys are largely used also in the heat exchangers of practically all the large oil and sugar refineries on the Pacific Coast, and in the surface condensers of all the large fleets of Pacific Ocean tankers.

The service conditions for condenser tubing in seagoing condensers and, in fact, for all steam and water piping aboard ship have become increasingly severe during the past few years. This fact has led to the development of many alloys for surface condenser tubes, and in this development Bridgeport's research department has been fully abreast of the times.

For special seagoing conditions, Bridgeport offers the following special alloys:

Cuzinal, an aluminum brass, containing 76 per cent minimum of copper, 1.75 per cent minimum of aluminum, a trace of lead and iron, and the remainder

zinc, especially recommended for aerated sea water conditions.

Duronze IV, a special aluminum bronze alloy, 95 to 93 per cent copper, 5 to 7 per cent aluminum, which withstands impingement corrosion attack better than most alloys, and is often recommended where other alloys fail.

Cupro-Nickel, copper, 70 to 80 per cent; nickel, 30 to 20 per cent; recommended for excessive corrosion conditions combined with high temperatures.

Duronze II, copper with 2 per cent silicon, has the corrosion resistance of copper with considerably greater strength and stiffness.

Copper tubing and copper pipe are coming into wide use on shipboard for many purposes other than condenser tubing. This is especially true since the standardization of wrought copper pipe fittings as developed and manufactured by the American Radiator Company, in cooperation with the Bridgeport Brass research department. These fittings are finished so that the tube outside diameter makes an ideal fit for sweating into the bore of the fitting. Brass and wrought copper unions with toughened threaded joints are inserted where advisable for assembly and dismantling. Copper pipe installed in this manner is ideal for drinking water, bathing water, sanitary drains, and other piping systems aboard ship, and has several advantages over ordinary iron pipe:

(1) Because of low internal friction and absence of corrosion accumulations, copper pipe gives equivalent capacity in smaller sizes. Hence, comparable cost and lower weight.

(2) When installed with sweated wrought copper fittings, copper pipe may be used with a thinner wall than iron pipe; hence, reduced weight.

(3) Installation, changing or removing is done at minimum labor costs.

(4) When eventually scrapped, copper has a much higher salvage value.

The Bridgeport Brass Company very recently received, through its San Francisco office, a very tangible and substantial proof of the fact that San Francisco engineers and the State of California appreciate the service record of the past forty years and the modern research activity that characterizes this firm. We refer to the recent award by the San Francisco-Oakland Bay Bridge engineers for the entire bronze trolley wire catenary electrification for rapid transit of Key and Southern Pacific interurban trains on that great structure. The trolleys, messengers, and supporting cable are all to be supplied by Bridgeport. The trolley will be of the famous Bridgeport Phono-Electric Bronze, which is now serving many of the electric rail roads in California.

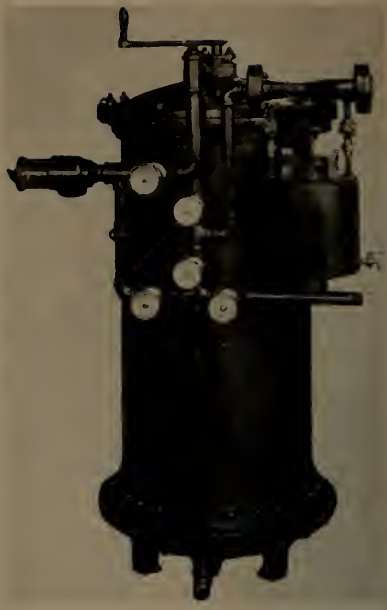
Underwater Cutting Torch

In the construction of large dams, such as the Grand Coulee, for instance, and large bridges, such as the San Francisco-Oakland Bay Bridge and the Golden Gate Bridge, underwater cutting must frequently be undertaken, occasionally at great depths below sea level. While the Victor Welding Equipment Division of the Victor Equipment Company heretofore produced underwater cutting torches quite adequate for shallow depths, the particular operations mentioned afforded an excellent opportunity to develop a heavy duty underwater cutting torch.

For greater depths hydrogen is used as a fuel gas, and the design of the torch is such that it is easy to handle by the diver, being provided with an adjustable compressed air jacket and permitting ready exchange of a 90 degree angle cutting head for a straight head assembly. The construction of the torch is sturdy enough to withstand usage at lowest encountered depths.

Bridgeport tubes help maintain the arduous schedule of the Dollar turbo-electric transpacific liner President Hoover

Portable Water Aboard Ship



Water storage aboard vessels has two primary uses. One is for boiler feed purposes and the other is for domestic and drinking water only. As the water used for drinking purposes and the culinary department is definitely separated from other uses, one reason for being concerned with the quality of water would be due to the fact that most of the water delivered from the domestic system at ports of call is not filtered water, and the other is that accumulations in the tank, unless cleaned regularly at considerable expense and trouble, would render the water more turbid than the actual delivered water from the filling lines at ports of call.

These accumulated turbidities in themselves are not particularly dangerous, but the appearance of the water very often is turbid in character; and any suspicion on the part of patrons is not looked upon with favor by those operating the ships.

Furthermore, accumulations of turbidities in a tank that is obviously open to the atmosphere, or has access through vents to the atmosphere, is liable to bacterial contamination unless the turbidities, usually organic in character, are regularly removed before entering the points of distribution. Another important point is that the U.S. Treasury Department has set certain standards which are the criterion for necessary water standards, and compliance with these standards is usually required within the jurisdiction of the United States.

These standards, whether or not enforceable, if complied with, safeguard the traveling public from pathogenic disturbances caused by impure water supplies. The standards require that the bacterial count shall be less than 100 total count per c.c., and that the B. coli from excess turbidity which offers a source of potential pollution if allowed to accumulate to too great an extent.

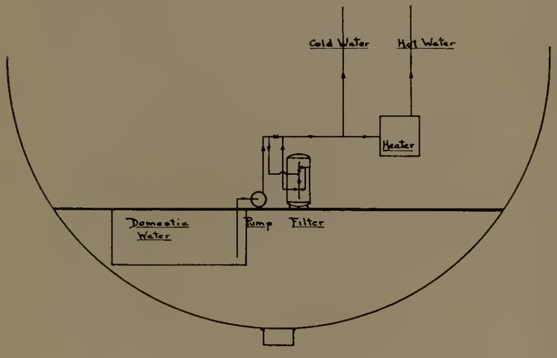


Diagram showing arrangement of filter in ship.

Adequate filtration of the circulating water in the domestic system removes the visible turbidities and thereby reduces the potential bacterial contamination. In addition to this feature, organic matter which, if allowed to accumulate, very often causes disagreeable tastes in the water is also removed in this process.

The type of filter adapted for marine usage is somewhat different in character from the ordinary equipment where an unlimited supply of water is available for washing the filter unit. The filter for marine service is constructed of heavy steel, in which is contained a strainer system, activated carbon and specially graded filter sand. If this filter is installed on the discharge of the domestic circulating pump, there will be continuously removed any organic or suspended matter which may have accumulated in the storage tank. This process continues until such a time as the gages on the filters show that the filter is becoming clogged with the suspended silt which has become entrapped in the filters. At this point the valves are so adjusted that there is a reversal of flow in the unit which lifts the silt out and discharges to waste. An agitator crank is provided, which assists the upflowing water to discharge this silt, thereby conserving the wasted water. This is an important feature, as ordinarily water would be wasted and valuable capacity dissipated unless there was some mechanical assistance in the washing process. The entire washing requires only three or four minutes, and the filter is then ready for service. The process is simple and automatic, and has advantages over the type of unit where the entire filter medium has to be taken out, removed, and

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Full View Windows for Shipboard Use

Kearfott Fulvu Window

The Kearfott Engineering Company for many years have been evolving the best types of windows for various purposes on shipboard. Their most recent development in this field is the "Fulvu" window, especially designed for promenade deck enclosures and for any location where a large plate glass window is desirable.

The Matson Navigation Company, recognizing the advantages of the Fulvu design, ordered 50 of these windows for the lanai verandas which are planned for B deck on the reconditioned Malolo. Work on the Malolo, being held up by shipyard strikes, has now been postponed until next fall. The windows, however, have been completed and delivered and will be ready for installation when work is resumed.

The name typifies the characteristics of this window. Its frame is fitted with glass throughout its entire height, which extends from a few inches above the floor deck level to the underside of the beams of the ceiling deck.

This glass is arranged in four horizontal panels in steel frame. Upper and lower panels are fixed. Two central panels are arranged to slide vertically, and are geared so that when the upper central panel is raised the lower central panel automatically slides down. This movement is manually controlled in the same manner as the hand operation of a house window ashore. The upper and lower slidable panels counterbalance each other, and therefore hold their adjustment in any position.

The net glass measurement for transmission of light by these windows is 30 inches in the width and 80 inches in the height. This results, of course, in an exceedingly well lighted veranda deck and in a seascape vision for the passengers exceeding anything heretofore attempted on shipboard.

The glass used is Pittsburgh 3/8 inch thick heat treated plate with a guaranteed strength four times that of ordinary plate.

In addition to the Fulvu windows, Kearfott also supplied for the Malolo reconditioning 18 type K-500 crank operated vertically sliding windows, six of which are glazed with 1/2 inch thick Pittsburgh heat treated plate and the balance with 3/8 inch of the same. These are all arranged with a weathering feature which makes them completely water tight.

Matson liner Malolo is to have her boats raised one deck and is to have a series of lanai veranda suites on B deck fitted with Kearfott Fulvu Windows.

Preventing Oil Pollution in Harbors

Few problems have attracted more attention throughout shipping circles during recent years than that of the oil pollution of streams, harbors, and coastal waters. Governmental, community, and personal interests have converged upon it with a vengeance. Public agitation got results from the lawmakers to the tune of Federal laws providing penalties as high as $2500 fines or one year imprisonment for those found guilty of dumping oily wastes in navigable waters. The Coast Guard was a very convenient police force, and it has kept an unremitting watch on vessels to prevent dumping and to apprehend suspects.

Despite laws, however, the oil pollution problem remains . . . and community and personal interest has waxed even warmer. We find fifty city, county and beach officials of Southern California communities, for instance, meeting to plan concerted action to fight oil pollution of Southern California coastal waters. Among the facts brought out at such meetings are that twenty-two gallons of oil will cover one square mile of ocean, and that oil which floats ashore presents a definite fire hazard in harbors as well as being a menace to bathers and to ocean fishing. One oil tanker dumps its bilge water . . . . and fifteen miles of coastal waters are polluted . . . an actual case.

The separation of oil from bilge and ballast water is by nature a very difficult technical problem, and the problem has become even more difficult with the increasing use of heavier oils for fuel. The cracked residuum now commonly used forms an emulsion with sea water that offers extremely high resistance to separation, and the specific gravities of the oil and water are so nearly the same that difference in gravity cannot be relied upon as a separating factor.

There was brought to bear on this problem, however, the extensive knowledge of oil and water emulsions possessed by the Petroleum Rectifying Company of

Fig. 1: Petreco ballast water separating units set up on oil barge for service in Los Angeles harbor.

California. This company has engaged in developing dehydrating processes and equipment for use by crude oil producers for over a quarter-century. It has carried on intensive research into the physical chemistry of petroleum emulsions and the phenomena of dehydration. Coupled with this background of research was the company's practical experience in fitting their crude oil dehydrating process and equipment to thousands of individual emulsion problems. An idea of the importance of the union of these two factors may be gained from the fact that the history of this company is practically the history of electrical dehydration in the oil industry.

Recognizing these facts, a leading steamship company referred its ballast water disposal problem to the Petroleum Rectifying Company several years ago. There followed an extensive program of laboratory study, experiment, and engineering development on the part of the company's technicians and engineers. The Petreco Ballast Water Separating Process was the result.

Operation of the Petreco Process may be followed in Fig. 2. The oil contaminated ballast water is pumped from the ship's tanks through the pipe-line "A," into the upper portion of the separator "B." By means of the pump "C" a chemical treating agent is injected into the oily water prior to its introduction into the separator.

An engine or motor-driven air blower, "D," supplies low pressure air which is introduced into the bottom of the separator in such a manner that it rises through the oil water in myriads of small bubbles. These rising bubbles contact the oil particles in the downwardly moving water stream and sweep them to the top of

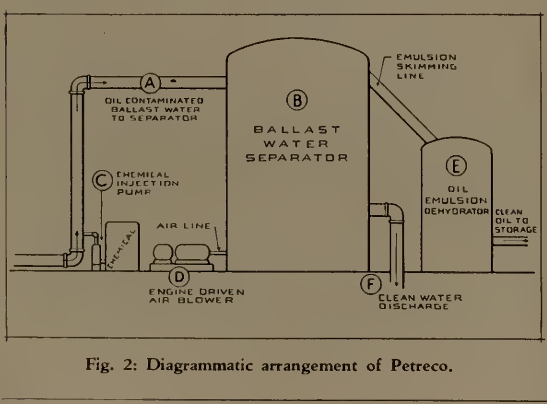


Fig. 2: Diagrammatic arrangement of Petreco.

the separator. After reaching the surface, the oil particles form a floating layer of emulsion, due to the action of the chemical.

This emulsion is automatically skimmed off into a dehydrating tank "E," from which it passes to storage. The water flows out of the separator through the pipe "F," and is discharged overboard, at which time it is almost entirely free of oil particles.

The first installation of the process was made almost three years ago in Los Angeles Harbor. This unit was set up on the barge Erskine M. Phelps for the purpose of serving ships coming into port. The separator tank in this installation is 10 feet in diameter by 12 feet high. The unit handles ballast water containing from one to five per cent of 10.0 degrees API fuel oil at an average rate of 400 barrels per hour. The through put of a single unit ranges up to 750 barrels per hour. Larger capacities can be provided through multiple unit installations.

The Petreco process has successfully cleaned hundreds of thousands of barrels of ballast water, the clarified water meeting the strictest requirements of harbor authorities. Over a period of eighteen months this process was used to dispose of approximately 125,000 barrels of ballast water for the Dollar Line ships serviced at Los Angeles Harbor. In a comparatively recent run 4,000 barrels of oil-contaminated water were removed from one of these vessels at an average rate of 500 barrels per hour. The specific capacity required for any individual installation can be provided.

The significance of the successful development of the Petreco Ballast Water Separating Process will be appreciated by shipowners and operators and territorial and harbor authorities alike. For the latter it is a medium for amelioration of the oil pollution problem and for its eventual elimination. And of no slight interest to ports is the fact that the safe disposal of ballast water right in port is likely to be followed by the taking on of an equivalent amount of fuel oil, which might otherwise have been taken on at another port.

To shipowners and operators this process promises some very welcome benefits. Collectively they will be relieved of being the storm center of the oil pollution problem, while individually they will be relieved of conflict with port authorities and the companion expensive delays in loading and clearing. All ships carrying separator units can dispose of their ballast or bilge water at any point or time desired, a decided advantage to oil burning or oil-carrying vessels, while those ships using harbor units can go into port properly ballasted. In port there is no time lost disposing of ballast, as the ballast water is pumped overboard while the ship is loading, and all tanks are available for fuel.

This procedure has saved one steamship company thousands of dollars in fueling costs, hundreds of thousands of extra barrels of fuel having been taken on at a port in which low prices prevail.

Such benefits as these, and the seriousness of the oil pollution problem, makes this process a highly important development.

Another view of separating plant on barge.

A-B-C of Air Conditioning

(Continued from Page 29)

A plentiful supply of 50° water obtained from wells or other natural sources is the cheapest way to do air conditioning. The water is used in an air washer and then run into the sewer. It cannot be used in the air washer a second time unless the heat is taken out of it.

There are several other methods of air conditioning being proposed at the present time, but none of them has yet reached the commercial stage. Several installations have been made in Fresno of an air conditioning apparatus which works very well when the relative humidity is low. It is constructed with two fans, No. 1 fan taking, say, 500 c.f.m. of outside air at 100° D.B. through a heat exchanger and into the room, No. 2 fan taking 500 c.f.m. of outside air at 100 D.B. and, say, 70° W.B., saturating the air, which drops the temperature to the wet bulb, or 70°, and then through the same heat exchanger, where it cools the air handled by fan No. 1 to about 77°. The air from fan No. 2, after passing the heat exchanger, is discharged into the attic space, if there is one, thereby lowering the heat load through the roof and ceiling.

A combination of cold water and refrigeration makes a good arrangement, with a lower installation and operating cost. Sixty degree to 65° water from a well or other source is first pumped through cooling coils and then through the water jacket of the refrigerant condenser. From the condenser the water runs into the sewer or other waste outlet. The air, partly cooled in this first stage, passes through the coils cooled by the refrigerating equipment, which cools it further and lowers the dew point.

It has been generally accepted by the medical profession that air conditioning is a help to people suffering from asthma, sinus, and similar ailments. It is an economic factor in industrial establishments, as the workmen are performing their duties in ideal climatic conditions, and therefore at greater efficiency.

It is of great benefit to theaters and to restaurants by making the patrons more comfortable, thereby inducing larger patronage and increased revenue.

Port of Portland Notes

Albert E. Horn, Jr.

● **Oil Man Heads Operators**

Albert E. Horn, Jr., division manager of General Petroleum Corporation, is the 1937 president of the Portland Steamship Operators Association, elected to this office in appreciation of the large amount of shipping done by oil companies through Portland. Petroleum products from California, distributed to Oregon, Washington, and Idaho consumers, account for one-half of the total cargo tonnage and one-fourth of the value of cargo moved through this port.

L. J. Hoffman, district manager of Swayne & Hoyt, Ltd., was elected vice president, and Alex J. Chalmers, president of Chalmers Shipping Company, was made secretary-treasurer. Trustees include these officers and A. B. Natland, district manager of Alexander & Baldwin, Ltd., and W. L. Williams, district manager of Hammond Shipping Company. Williams was 1936 president of the Association.

● **Ferry Converted to Towboat**

The ferry Westport, which has served automobile tourists crossing unbridged coastal streams since 1925, has been retired from that service as the result of completion of the Umpqua River bridge at Reedsport, and is being rebuilt into a diesel-powered towboat. Her first assignment will be towing barges laden with rock for the extension of the Umpqua south jetty.

The boat is 65 feet long, built in Portland in 1925, and will be powered with two 100-horsepower four-cylinder Enterprise engines driving twin screws. Adequate living quarters for the crew will be installed.

Student Propeller Club

The Propeller Club of the United States, Port of University of Oregon, Eugene, was chartered to student membership at a ceremonial dinner held at Eugene January 30. Phil Thurmond, secretary of the Portland chapter, made the charter presentation to Professor A. L. Lomax and his group of 35 student members, in the absence of Captain E. F. Lovejoy, national vice president, and K. C. Conyers, Portland chapter president.

Tug Diamond Z-11, largest all-welded steel tug built in the Pacific Northwest. She was described in February issue of Pacific Marine Review.

● **Norwegian "Chips" Builds Model**

Whittling his spare time between Europe and the Pacific Coast, Carl Carlson, carpenter on the trim Norwegian motorship Washington Express, has fashioned five accurate models of the slim, white ship and presented them—for a price—to admirers of his art.

Carlson's latest work, and his best, he asserts, is now the property of a Medford, Oregon, fruit exporter, Raymond Ritter, who purchased the 3½-foot model when the Washington Express called in Portland early last month. Another model is owned by the owner of the Washington Express.

● **River Steamer Lost**

Snagging a large hole in her hull on a submerged rock in the Willamette River 10 miles above Portland, the $50,000 stern wheel towboat Ione capsized and sank in swift water February 4, forcing her crew of 11 men to leap to safety on a barge being pushed by the tug.

The 147-foot Ione, built nearly fifty years ago and rebuilt in 1911, was declared a total loss. She had once been an important freighter on the Columbia and Willamette Rivers, and was owned in recent years by Western Transportation Company, the maritime subsidiary of Crown-Willamette Paper Company.

● **Port Commissioners Elect**

H. L. Corbett has been re-elected president of the Port of Portland Commission, Miles Standish as secretary, and Drake C. O'Reilly as treasurer. Cameron Squires was elected vice president to succeed Paul C. Bates, whose term expired in January and who was not re-appointed.

● **Steamer Sold**

States Steamship Company has sold the steamer New York, ex-West Kader, to Waterman Steamship Corporation, purchasers of several other vessels on both the West and East Coasts during the last few months. The New York, built at South San Francisco in 1919, is the vessel that stood by the wreck of the

British motorship Silverhazel in the Philippines November 11, 1935, and summoned assistance of a United States destroyer.

States Line also has chartered the steamer Washington, last Pacific Coast owned ship on the Pacific during the strike, to Weyerhaeuser Steamship Company for a long period. This will be the eighth vessel in the Weyerhaeuser Pacific Coast Direct Line service.

● New Terminal Initiated

The new port terminal at Vancouver, Wash., was initiated February 8 when America's largest freighter, the Lewis Luckenbach, called there for cargo. The 529-foot vessel had no difficulty turning around without assistance of tugs in the turning basin opposite the terminal. Officials and townspeople who welcomed Captain W. Finken and his vessel forecast many repeats of this initial call.

● Engineer Recalled

After spending the last four years building the $50,000,000 Bonneville Dam and starting upper Columbia River channel improvements, Lieutenant-Colonel Charles F. Williams, district engineer for the 2nd Portland district, United States engineer corps, has been ordered to relinquish his post here and report for duty as an instructor in river and harbor engineering at the army engineering school at Fort Belvoir, Va., next summer. He sails on an Army transport from San Francisco July 30th for New York City.

Charles F. Williams came to Portland from Panama Canal Zone, and was in charge of all engineering in this region until about two years ago when Colonel Thomas M. Robins, division engineer, moved his office to Portland and divided this district into two districts, one to include the lower Columbia and coast areas, and the other to include the upper Columbia and Bonneville project.

Announcement was also made by Colonel Robins that the 2nd Portland district offices will be moved to Bonneville July 1 and the district renamed "Bonneville district." The Bonneville engineering staff is being gradually reduced as work on the dam nears completion. Eventually the district will have a personnel of only 90 men, whereas several thousand are at present employed in it, Colonel Robins stated.

● Maritime Veterans Pass.

The grim reaper recently took two of the Columbia River district's best known maritime men, Perry Rosenstein, the ship chandler who knew all the old-time sailing ships back at the turn of the century, and Captain Charles Hooghkirk, who ferried a few millions of passengers across the Willamette River at Portland in the later 1880's.

Mr. Rosenstein was employed by the Oregon Marine Supply Company and Pacific Ship Chandlery during recent years, but gained his fame during the halcyon days of waterfront boarding houses and "shanghai" artists. A native of Oregon City, he conducted a brisk clothing business at Third and Burnside Streets, the center of the waterfront's night life a quarter of a century ago, selling his goods principally to sailors and officers of sailing ships which called at Portland for grain and lumber. He was reputed to have amassed a comfortable fortune in those days, only to have it dwindle in later years. His friends have spent many pleasant afternoons listening to his stories of old days.

Mr Rosenstein died February 10, leaving his widow and two brothers to mourn him.

Captain Hooghkirk was one of the colorful masters who piloted the fast rival steamers Cyclone and Alarm between the foot of Stark Street and the Albina district, on the east side of the Willamette before the bridges were built. He came to Portland from the Mississippi River in 1881 and served consecutively on the ferries Fleetwood, Telephone, Puritan, and Cyclone.

He then purchased an interest in the Iralda and transported dairy products and general merchandise between Portland and Rainier, calling at all docks en route. He commanded the Longview-Rainier ferry prior to construction of the Longview bridge, and later was employed by the bridge company. He died at his home in Rainier January 19.

● Odd-Shaped Buoys Built

The United States lighthouse service has recently had three strange buoys constructed by the American Sheet Metal Works, Inc., Northwest Eleventh Avenue and Glisan Street, Portland, for use in the Columbia River above Celilo as soon as river traffic is resumed. The buoys are similar to buoys found most suitable for swift water in eastern lighthouse districts, according to E. C. Merrill, superintendent of the 17th district.

They are shaped somewhat like the flatfish so often yanked out of Oregon coastal waters by sport and commercial fishermen. They stand about 7½ feet high, without their lights and bells, are 3½ feet from blunt bow to sharp stern and two feet thick at the thickest point. A 240 pound weight attached to its bottom is expected to keep each buoy upright, even in unusually fast water. Interior space provides for the housing of the heavy storage batteries that provide electric power for the lights.

Portable Water Aboard Ship

(Continued from Page 34)

discarded. These units have been in service more than twenty years for this particular class of treatment, and have proved of value in every case where water conservation is an important item.

The installation requires very little floor space and can easily be attached to the present circulating system without any change in piping arrangements, with the exception that a connection is taken off of the pressure pump from the tank to the filters and back again into the same line. A by-pass valve is usually installed between these inlet and outlet connections so that, in case the filter is out for washing, the by-pass can be opened without decreasing the pressure on the system.

In cases where there is ample room two units could be installed, so that one unit could be on the line while the other unit was being washed. However, the time required for washing is usually so short that there is no interruption of service. The use of filtered water will be found to be a very valuable item in the maintenance of the very best conditions for the traveling public.

These filters are manufactured and installed by the California Filter Company, of San Francisco, California.

Marine Insurance Review

Page—President

Fireman's Fund Insurance Company

Acceding to his request to be relieved of the burdens associated with the presidency of a large group of insurance companies, the board of directors of Fireman's Fund Insurance Company elected former president J. B. Levison chairman of the board at a meeting held in San Francisco on Tuesday, February 2.

Succeeding Mr. Levison, Charles R. Page was elected president. Similar action by the Boards of Directors of affiliated companies will make Mr. Levison chairman, and Mr. Page president, of the companies comprising Fireman's Fund Group.

● The Retiring Executive

Born in Virginia City, Nevada, Mr. Levison was brought by his family to San Francisco in 1875, and soon thereafter obtained his first job in the office of the New Zealand Insurance Company. Two years later he secured a position in the marine department of Hutchinson & Mann, prominent San Francisco agency.

When a group of San Francisco financiers organized the Anglo-Nevada Assurance Corporation in 1886 he joined the new concern as marine clerk, being later elected marine secretary.

With the absorption of the marine business of the Anglo-Nevada by Fireman's Fund in 1890, Mr. Levison moved to Fireman's Fund as marine secretary. Promotion came in January, 1900, when he was named second vice-president. However, he retained his supervision of the company's marine operations. In January, 1914, he was advanced to the post of vice-president.

On April 1, 1917, Mr. Levison was elected president, following the retirement of Bernard Faymonville. He has therefore held the position longer than any president except David J. Staples, who served from 1867 to 1900.

Fourth president of Fireman's Fund, Mr. Levison was the second chief executive to reach this office through the company's marine department, and Mr. Page has followed the same course. The precedent was set by William J. Dutton, who was president from 1900 to 1914.

In the difficult months following the San Francisco disaster of 1906 Mr. Levison conceived, and was chiefly responsible for the execution of, the daring plan of rehabilitation by which the company was successfully led out of its difficulties.

Mr. Levison was personally responsible for the entrance of the company into the field of automobile insurance—it being remembered that Fireman's Fund

At left: Charles R. Page, newly elected president of the Fireman's Fund Insurance Company.

At right: J. B. Levison, former president and now chairman of the board.

was the first company to write automobile insurance on a nationwide scale.

During his twenty years as president the four affiliates of Fireman's Fund have come into being. Home Fire & Marine Insurance Company, organized in San Francisco in 1864, purchased by Fireman's Fund in 1892, and withdrawn from active operation in 1906, was re launched in 1917.

In June, 1927, Occidental Indemnity Company was organized, followed in December of the same year by Occidental Insurance Company.

In April, 1930, Mr. Levison's plan for a strong fleet of companies doing a multiple line of business in all fields was completed with the launching of Fireman's Fund Indemnity Company.

● The New President

Charles R. Page, the new president of Fireman's Fund Group, was born in San Francisco in 1878. His father, Charles Page, was an admiralty attorney and served Fireman's Fund as counsel and as director for many years.

Mr. Page was prepared for college at St. Paul's School, Concord, N.H., and entered Yale University, from which he graduated in 1900. After graduation he joined the marine department at Fireman's Fund headquarters in San Francisco, and was later promoted to a position which gave him charge of all marine and automobile losses.

With the entry of the United States into the world war, Mr. Page's intimate knowledge of ships and shipping brought him an appointment by President Wilson as commissioner of the United States Shipping Board and trustee of the Emergency Fleet Corporation.

Resigning his position with Fireman's Fund, Mr. Page devoted his whole time and energy to the service of the government. The value of his services to the cause of the Allies led to his being decorated by the French government as a chevalier of the Legion of Honor.

At the close of 1921 Mr. Page rejoined Fireman's Fund as manager of the Atlantic Marine Department in New York City.

Elected vice-president of Fireman's Fund and affiliated companies in 1926, Mr. Page shortly thereafter moved back to San Francisco to assume general direction of the marine and indemnity operations.

He has served the San Francisco Chamber of Commerce as director and vice-president. He has also served the Chamber of Commerce of the United States on its insurance department committee. Mr. Page has also taken a prominent part in the work of the San Francisco Community Chest. He has served as president of the American Institute of Marine Underwriters, the United States Salvage Association, the Board of Underwriters of New York, and the American Marine Insurance Syndicates.

Fireman's Fund in 1936

The 74th annual meeting of Fireman's Fund Insurance Company was held February 2, with the company's annual statement presented by president J. B. Levison.

On the basis of the Insurance Commissioners' requirements, gross assets were $40,620,000, with policyholders' surplus $23,558,000. The policyholders' surplus is the largest in the company's history.

At actual market values as of December 31, 1936, gross assets totaled $41,836,000, compared with $38,200,000 at the end of 1935. Policyholders' surplus at actual market values was $24,775,000, compared with $22,024,000 at the end of 1935.

Total premium income from all sources amounted to $16,326,000 for 1936, compared with the 1935 total of $15,306,000—an increase of over a million dollars.

Fire premiums written by Fireman's Fund aggregated $8,065,000 in 1936 against $8,046,000 in 1935.

Marine premiums were $3,744,000, compared with $3,434,000 in 1935.

Automobile premiums were $4,517,000 in 1936 against $3,822,000 in 1935—an increase which further strengthens the company's dominant position in the field of automobile insurance.

Commenting on the increasing difficulty of maintaining the level of investment income in the face of reductions in interest rates, Mr. Levison reported that net income from investments was $1,329,000 against $1,256,000 in 1935.

In closing his report Mr. Levison said: "Notwithstanding current tendencies to rate reductions, the in-

crease of insurable values, the upward swing in employment, and the stimulus to trade which flows out of an increased prosperity inevitably find their reflection in our business; and as our companies are strong in the respect of the insuring public, and are particularly fortunate in the loyal support of a strong agency plant and in numbers of broker friends, backed by a splendid group of devoted employees, we may well look to the future with confidence."

The following directors were elected: Edward T. Cairns, Colbert Coldwell, Edward L. Eyre, M. Fleishhacker, A. P. Giannini, J. B. Levison, C. O. G. Miller, Henry D. Nichols, Charles R. Page, Henry Rosenfeld, and Franklin A. Zane.

Was This Our Old Friend, Sinbad (IBN Bat) the Sailor?

The December issue of "Field Engineers Bulletin," U. S. Coast and Geodetic Survey, quotes the following from a Catalogue of Typhoons, 1348-1934, compiled by Rev. Miguel Silva, S.J., of the Manila observatory, and published in 1935. The similarity of the name and the wide spread of travels of this Morish wanderer lead us to claim him as the embodiment of our favorite legendary seafarer, the immortal Sinbad.

"1348, July. The Moorish traveller, Ibn Batuta, visited Sumatra, the Philippines and China, crossing the China Sea twice, during the middle of the 14th century.

"Ibn Batuta, on his return trip to Sumatra, sailed from a place near the modern Amoy, about July or August, 1348 (or 1347?), on board a swift ship belonging to the king of northern Sumatra. It was the custom of these ships, sailing from Amoy, not to follow the coast, but to direct their course straight towards southern Sumatra, passing some distance to the west of the Philippines and Borneo.

"Of the trip, Ibn Batuta says: 'We had a fair wind for ten days, but as we got near the land of Tawalisi, namely Sulu, Palawan and northern Borneo, it changed and grew violent, the sky became black, and heavy rain fell. For ten days we never saw the sun, and then we entered on an unknown sea. The sailors were in great alarm, and wanted to return to China, but this was not possible.

"'In this way we passed forty-two days, without knowing in what waters we were. On the forty-third morning after daybreak we descried a mountain in the sea, some twenty miles off, and the wind was carrying us straight for it. The sailors were surprised and said: "We are far from the mainland and in this sea no mountain is known. If the wind drives us on this one we are done for . . . ." It was then some ten miles from the junk. But God Almighty was gracious unto us, and sent us fair wind, which turned us from the direction in which that mountain was . . . . Two months from that day we arrived at Sumatra, and landed at the city of Sumudra.'"

1936 Accident Toll

The National Safety Council said recently that accidents, sucked along in the wake of a nation rising from the depths of depression, killed 111,000 persons in 1936 and cost Americans about $3,750,000,000 (correct). Both figures are all-time high totals.

Tornadoes, floods, excessive heat, increased employment, and a sharp jump in motor vehicle travel, were indicted for the increase which wiped out the previous record of 101,139 set in 1934.

In addition to deaths, the Council said, about 400,000 were permanently disabled by accidents last year, and 10,300,000 temporarily disabled.

The country's bill for recklessly and carelessly "stubbing its toe" was broken down into $2,630,000,000 (correct) in wage loss and medical expense, $830,000,000 for property damage resulting from motor vehicle accidents, and $290,000,000 for fire loss.

While accident totals increased in every phase of human activity, the Council pointed out that the increased totals were accompanied by even larger jumps in "exposure" to accidents, "leaving solid ground for belief that when the country once more is definitely on the high road of prosperity with employment and automobile travel at fairly constant levels, the accident totals will shrink rapidly in the face of intelligent safety work."

99% Fire Proof

By J. P. Kiesecker

Interest in fireproof construction for vessels will be heightened by the news that pioneer work in this field has been done on a ship which is being completed at the works of The Maryland Drydock Company in Baltimore, a subsidiary of the Koppers Co. of Pittsburgh. The owners, the A. H. Bull Steamship Company, are among the first to take steps to comply with the demand for such construction. Acting on the first demand of their service for a passenger and freight ship, they authorized the reconditioning of one of their vessels, the steamer Catherine, for the West Indies Inter-Island trade between Puerto Rico and the Virgin Islands. The time element was very important, but they ordered the complete rebuilding of the vessel to provide accommodation for about 75 passengers in accordance with the latest requirements of the United States Government.

The Government appointed a commission to conduct fire tests on a vessel in the James River some months past, from which data, rules, and regulations were drawn up and issued to govern future ship construction. The Catherine embodies these regulations and even exceeds them in certain features, in that less than one per cent of wood is used, whereas ten per cent is allowable if applied to fireproof surfaces of the interior. The Catherine also exceeds the requirements for watertight integrity, as additional bulkheads were installed to make the vessel a two compartment vessel, instead of a one compartment vessel, which is all the Government required for a vessel of this size.

Briefly, the vessel is subdivided into compartments to localize any conflagration by a proper insulation of the main structural bulkheads, so that all steel structures surrounding the machinery and the working spaces in the vessel are covered with material at least 4 inches thick which is absolutely fireproof. The 4 inch protection is fitted as a lining to the steel deck houses, to bulkheads surrounding public spaces and stairwells, and to the underside of decks. This thick fireproof material does not leave any exposed steel surface to conduct the heat of a fire to adjoining spaces.

In passenger quarters, all light divisional bulkheads necessary to subdivide the spaces into staterooms are made of fireproof compressed panels supported by a light steel structure which is completely covered to prevent heat distortion and collapse of the supporting members. Doors to staterooms, lavatory spaces, and other apartments within the passenger accommodation are solid fireproof compressed panels suitably surfaced and trimmed with non-ferrous metal binding pieces.

All electric wiring is heavy leaded and armored cable run chiefly in the steel supporting structure of the divisional bulkheads.

Doors in deck houses are either solid steel (where weight considerations control), or doors of the Kalomine type, consisting of a core covered with sheet steel over all surfaces. In the fire screen bulkheads all doors are made of the same fireproof material as the insulation used on the bulkhead itself, and are provided with devices which keep them closed at all times to prevent sharp drafts from a fire blowing the door open and thus allowing the spread of a fire to any adjoining spaces. Even the doors from dining saloon to pantry are thus equipped and must be released by hand to gain access.

The deck in all staterooms, public spaces, passages, crew's and officers' quarters, is covered with several inches of a surfacing material of the magnesite type, which completely insulates the steel deck. On this surfacing material sheet rubber is applied as a floor covering.

In the passenger accommodations of the Catherine the materials used are all fireproof. The fixed furniture in public spaces and all stateroom furniture is practically fireproof—the berths are metal, the cabinets, dressers, and other furniture are constructed of thick asbestos sheet panels.

Such articles as draperies are limited to the bare essentials, and, as a further precaution, all curtains, spreads and bedding are flame proofed so that they will not support combustion.

Notwithstanding the complete fireproofing on this vessel, an architectural effect is obtained equal to anything previously done with wood paneling on a vessel of similar type.

The entrance lobby and surrounding passages, the stairwell and dining saloon, are finished in light reseda green, ornamented in gold. The stair railing is non-ferrous metal in silver and gold finish. The doors, door trim, and furniture are surfaced in sheet plastic material of the Bakelite type, relieved by polished binding metal with hardware to match. Mirrors are used extensively as a decorative feature on stair landings, smoke room, dining saloon, and in the staterooms.

On the after end of the bridge deck is located the smoking room, done in Spanish style with a colorful tile wainscot, rough plaster surfaced walls and ceiling, and old Spanish lanterns in gold finish. The decorative painting in this room is of the Spanish type, and the plain walls are relieved by gold pilasters and corbels decorated in color.

Immediately above the smoking room is the open shade deck for games and dancing, and adjoining is an attractive bar with sparkling mirror surfaces and indirect lighting. Over the back bar are two very realistic mural panels depicting Spanish dancers.

Fire alarm boxes and alarm bells are installed in public passages, and all spaces on the ship are equipped with alarms which operate thermostatically and mechanically, and record on indicators in the wheel house.

In the wheelhouse is located a cabinet containing smoke detecting apparatus for all the cargo holds and all storerooms. The holds are equipped with steam smothering lines and the usual hose connections.

The engine and boiler spaces are equipped to flood

(Page 56, Please)

Compact Capacity

In a Roller Pump

Type 2A roller pump.

The Hercules Roller Pump, manufactured by the Hercules Equipment & Rubber Co., of San Francisco, is now in its third year of production, and, according to its builders, is meeting a demand for a pump that is very compact and, at the same time, capable of delivering a large volume for its size and developing high pressures when needed. This pump is self-priming and a foot valve is not required, except under extreme conditions. It is used extensively for pumping water, lubricating oils, etc. It incorporates a new principle of pump design, that of a squeezing action of great power between the sealing rollers and the body of the rotor, producing a pump that, for its size, is capable of handling a surprising volume of liquid.

An open view of the pump is shown with the head removed. The line drawing shows the pump assembly. Both views illustrate the arrangement of hardened and ground stainless steel rollers, which perform the same duty as the sliding blades used in various types of rotary pumps, but in addition act as pistons in the propelling slots of the bronze rotor as they follow the eccentric bore of the pump case.

It will be seen from the drawing that the bore of the case is concentric with the rotor from point H for 88 degrees to point E, so that seal is insured between suction and discharge ports. Roller A is shown entering the eccentric portion of the bore at point E, which is the opening of the suction port. The widening of the eccentric bore past the suction port permits centrifugal force to throw the rollers out from the center of the rotor. The maximum of space between rotor and eccentric bore is at K, and each roller is sucking liquid through the suction port until it reaches point K. It should be noted that liquid is drawn in between each two rollers and into the space in the slot of the rotor (seen in dotted lines) in back of each roller, thus making the entire circumference of the rotor active without blind or inactive areas.

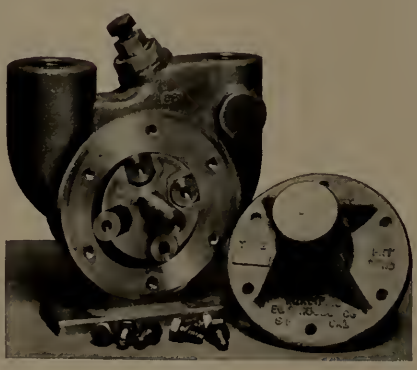
Hercules Types 3A, 5A and 6A roller pumps.

Discharge begins at K and continues until each roller passes the close of the discharge port at H, the roller being forced back into the propelling slot of the rotor with the narrowing down of the space be-

CAPACITIES
(Free Discharge)

2A—¾"	.75 gals. per 100 rev.
3A—1"	1.4 gals. per 100 rev.
5A—1½"	3.75 gals. per 100 rev.
6A—2"	7.00 gals. per 100 rev.

Type 3A Roller pump with head removed.



This illustration shows the arrangement of rotor and the rollers carried in contact with the bore of the pump case.

Pump installed for fire fighting, pressure spraying, etc.

...en it and the eccentric bore, the ...tion discharging the liquid between the rollers and that liquid in back of each roller.

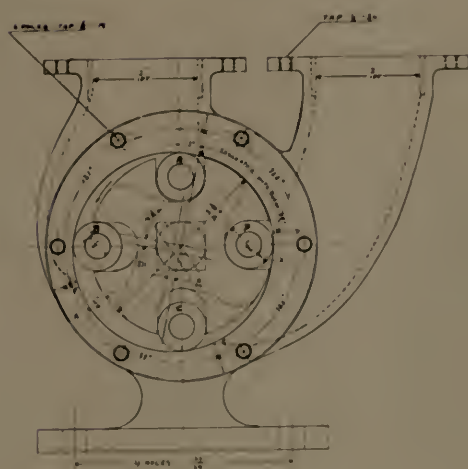
The steel rollers distribute wear over their entire circumference as they roll around the inner surface of the bronze pump case, and also adjust themselves to any wear that may occur in the cylinder circumference. The rollers are practically balanced in their bearing on the rotor blade, avoiding heavy side friction.

The pump illustrated is shown with four rollers, the construction used for ¾-inch and 1-inch sizes. For 1½ and 2-inch pumps five rollers are used.

The bearings of pumps of types 2A and 3A are Oilite porous bronze, and are kept saturated from a supply of oil in a well surrounding the bearings. Bearings of types 5A and 6A are nickel-babbitt automotive type, and are provided with oil seals at each end of the bearing.

Pacific Marine Supply Company uses Hercules Type 2A pump in its 50 lb. fire fighter and irrigation unit.

These pumps have found a liberal field in fire fighting, where compact design is required, together with large delivery volume and high pressure. It is of interest to note in this connection that the 3A-1-inch size is supplied, when desired, with complete fan belt drive, including clutch, so that any truck may be quickly converted into an efficient small fire fighter. The larger sizes are driven either with a power take-off from the transmission or by a special take-off in front of the engine crank shaft.



Drawing showing general layout of 6A pump.

It is stated that the U.S. Forest Service, State of California Division of Forestry, National Park Service, and others are using these pumps with success.

A 3-inch size, with capacity of 250 gallons per minute, is now being developed and will soon be available.

On account of self-priming features and development of pressure, the Hercules roller pumps are meeting reception for pumping bilges, flushing decks, etc. They perform an ideal service in the pumping of lubricating oils and the handling of gasoline.

On the Ways—

SHIPS IN THE MAKING

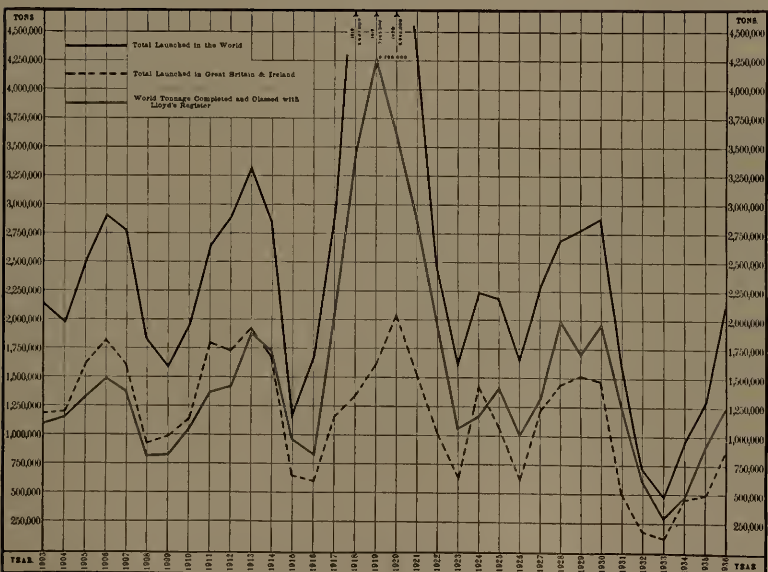
LATEST NEWS FROM AMERICAN SHIPYARDS

Countries.	Steamers. Steel. No.	Steamers. Steel. Gross Tonnage	Steamers. Wood. No.	Steamers. Wood. Gross Tonnage.	Motorships. Steel. No.	Motorships. Steel. Gross Tonnage.	Motorships. Wood. No.	Motorships. Wood. Gross Tonnage.	Sailing Vessels and Barges. Steel. No.	Sailing Vessels and Barges. Steel. Gross Tonnage.	Sailing Vessels and Barges. Wood. No.	Sailing Vessels and Barges. Wood. Gross Tonnage.	Total. No.	Total. Gross Tonnage.
Belgium ...	2	2,260	...	...	14	1,989	...	...	...	...	...	...	16	4,249
British Dom. Canada:— Coast ...	...	...	...	...	5	1,129	5	969	...	...	...	...		
British Dom. Canada:— Great Lakes	...	...	...	..	...	...	...	...	...	...	...	...	25	6,238
British Dom. Others ...	7	1,802	1	489	4	796	1	236	1	650	1	168		
China	4	4.739	...	...	1	760	...	...	...	...	...	...	5	5,499
Danzig ...	1	274	...	...	4	23,593	...	...	...	...	...	...	5	23,867
Denmark ...	9	17,922	...	...	24	79,297	2	318	...	...	...	...	35	97,537
Finland ...	2	2,050	...	...	...	...	...	...	...	...	...	...	2	2,050
France ...	6	16,614	...	...	11	22,594	...	...	...	...	...	...	17	39,208
Germany ...	80	125,344	...	...	81	254,637	...	...	...	...	...	...	161	379,881
Great Britain. England & Wales	122	251,764	...	...	52	197,710	...	...	9	1,645	...	...		
Great Britain. Scotland	68	184,032	...	...	57	153,655	...	...	7	4,242	...	...	328	856,257
Ireland ..	2	6,570	...	...	11	56,639	...	...	...	...	...	...		
Holland ...	2	6,318	...	...	66	86,863	...	...	1	650	...	...	69	93,831
Hungary ...	..	...	...	...	1	594	...	...	...	..	...	...	1	594
Italy	1	704	...	...	4	10,429	2	212	...	...	...	...	7	11,545
Japan	64	154,705	1	110	52	131,913	62	8,033	1	700	...	...	180	294,861
Lithuania ...	...	...	...	...	1	415	...	...	...	...	...	...	1	415
Norway ...	24	22,311	...	...	6	10,416	3	435	...	...	...	...	35	33,162
Portugal ...	...	...	...	...	1	300	...	...	...	...	...	...	1	300
Roumania ...	...	...	...	...	1	1,201	...	...	...	...	...	...	1	1,201
Russia* ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Spain	...	...	4	571	4	572	1	140	...	..	...	...	9	1,283
Sweden ...	3	3,102	...	...	30	150,942	...	...	...	...	...	...	33	154,044
United States Atlantic Coast	13	76,065	...	...	15	3,670	...	...	7	7,401	...	...		
United States Gulf Ports...	...	...	...	...	4	1,978	...	...	13	10,969	...	...	68	111,885
United States Pacific Coast	...	...	...	...	...	...	4	525	1	650	...	...		
United States Great Lakes..	...	...	...	...	...	...	...	...	12	10,627	...	...		
Yugoslavia...	...	...	...	...	1	116	...	...	...	...	...	...	1	116
Total... ...	410	676,576	6	1,170	450	1,191,606	60	10,868	52	57,534	1	166	999	2,117,924

WORLD SHIP-BUILDING AT A GLANCE

Table shows output of various ship-building countries for 1936.

Graph shows fluctuation of world output since 1903.



Panama Railroad Ships

Plans and specifications are being issued for two or three combination cargo and passenger vessels for the Panama Railroad Steamship Company, New York, having been prepared by George G. Sharp, naval architect, New York. The ships will be geared turbine steamships 468 feet long, 64 feet beam, 38 feet 6 inches deep, 6000 tons deadweight, and 100,000 cubic feet refrigerated cargo space. They will have a speed of 16½ knots and a passenger capacity of 200.

Survey Government Ships

With a view to determining their fitness for service as units of the American Merchant Marine or as naval auxiliaries, four big government freighters, the Pacific Hemlock, Pacific Pine, Pacific Spruce, and Pacific Redwood are to be surveyed at Lake Union, Washington, where they have lain idle for the past five years. Word received in Seattle from the Maritime Commission mentions these ships as being part of the 197 ships of the inactive fleet scheduled for dry docking.

Cargo Ships Planned

Theodore E. Ferris, naval architect, New York, has completed plans and specifications for the construction of three 17-knot cargo vessels, all to be the same in construction. Bids were received on February 10 for the ships, which will be 292 feet overall length, 48 feet 6 inches beam, and 18 feet loaded draft. Double reduction geared turbines driving a single screw and developing 5000 shaft horsepower will furnish the propulsion. Service speed required will be 17 knots.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date 9/-19/37. **Hull 5356—Maury (DD401);** completion date 12/19/37; two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $2,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; completion date, April 2, 1937.

THE CAMPBELL MACHINE COMPANY
Foot of Eighth Street
San Diego, California

NEW CONSTRUCTION:

Hull 53, Victoria, tuna clipper; Mathew C. Monise, owner. Length 135', main engine 600 h.p. 6 cylinder Union diesel. Launching date, November 1, 1936; **completion date, March 1, 1937.**

Hull 54, Triunfo, tuna clipper; Joaquim Canas & Co., owners. Length 125', main engine 450 h.p. 6 cylinder Union diesel. Launching date, November 10, 1936; **completion date, March 1, 1937.**

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION: **4 keels laid** July 6, 1936, Fellows Craft stock cruisers 30' x 8' x 2'6", powered with Kermath Sea Flyer 6-cylinder 85-H.P. engines with 2 to 1 reduction gears.

One 45 ft. ferry service boat powered with twin 110 H.P. Buda diesels.

Five 32 ft. W.L., 46 ft. O.L. One design sloop yachts, keels to be laid in the immediate future.

Auxiliary power, with small h. p.

One 60' high-speed glass bottomed sight-seeing boat powered with twin Hall-Scott marine motors.

DRYDOCK AND ROUTINE REPAIRS: **Yacht Araner, Fish and Game Commission patrol boat Blue Fin, yacht Sovia Del Mar; general repairs to 28 smaller yachts.**

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Barge No. 52, Midway, Gas. S. Northern Queen.**

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats;** 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laids September, 1936; estimated launching, May, 1937; expected completion, August, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: **Dickenson, M. S. Hawaiian Standard, U. S. L. H. T. Kukui.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: **Mine planter Bell, U. S. Penguin.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Water Barge YW30, Elizabeth, Seattle, Esther Johnson, Brunswick, Dorothy Wintermote, Patterson, American Star, Frances, Vagabond.**

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: **Prince George, Prince Charles; 2 scows; 3 fish boats; 19 ship repair jobs not requiring docking; 31 commercial jobs.**

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 23, 1935; estimated completion date, September 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935, estimated completion date, October 1, 1937.

Construction of **Destroyer No. 408, U.S.S. Wilson,** 1500 tons, keel not yet laid.

DRYDOCK AND ROUTINE REPAIRS: **Idaho, Mississippi, New Mexico, Lexington, Swallow, Samuel D. Ingham.**

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Keel laying begun for ten 36' and ten 29' stock keels.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: **Latouche, Mount McKinley, Lillian Luckenbach, Ferry Quilcene, Ferry Ballard.**

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley,** Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); estimated delivery August, 1937; keel laid January 14, 1936.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; completion date June 1, 1938.

U.S.S. Swordfish, Submarine (SS-193); order placed January 27, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Dent, Rathburne, Talbot, Waters, Milwaukee, San Francisco, Melville, Nautilus, Langley, Memphis.**

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION: **4 dump scows** 114'x26'x7'9"; **2 coal barges** 175'x26'x11'. **2 barges** 175'x26'x11'.

DRYDOCK AND ROUTINE REPAIRS: 20 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Hull No. 915, Four yard dipper dredge;** length overall 110'; breadth molded, 40'; depth molded, 8'; steel house 84'x24'x10'3" high; no living quarters. Designed for maximum bridge clearance of 15', which requires a frame and stack to be collapsible. Scotch boiler 13' diameter by 12'10" long; 160 lbs. pressure. To be built at Buffalo. Keel laid Decem-

ber 20, 1936; estimated launching date, March 1, 1937; delivery date, April 15, 1937.

DRYDOCK AND ROUTINE REPAIRS: J. P. Morgan, Wm. E. Corey, H. C. Frick, C. S. Robinson, Joseph Sellwood, J. S. Ashley, E. T. Weir, H. R. Jones.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis and DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hull No. 167, Ferryboat Aquidneck. Diesel electric ferry for U.S. Navy; estimated delivery, March, 1937.

Hull No. 169, Trawler, single screw, diesel propelled, for delivery to Boston, Mass., owners in April, 1937.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 172, "J" class sloop for Mr. Harold S. Vanderbilt; delivery spring, 1937.

Hull No. 173, Winchester, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, May 15, 1937.

Hull No. 174, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, June 1, 1937.

Hull No. 175, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 176, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION: **Heavy Cruis-**

DD-380, Gridley, 1500 Ton Destroyer. Keel laid June 3, 1935; launched December 1, 1936; estimated delivery, March, 1937.

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; estimated launching, February, 1937; estimated delivery, June, 1937.

CV7, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; estimated delivery February 1, 1938.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: Two oil **Tankers**—steam—425'x64'x34' for Gulf Refining Co.; total tonnage 7070 each.

Two 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots. Total cost for both vessels will be $4,000,000.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel towboats** of 450 H. P. each, for private parties. Delivery dates May 1, 1937, and June 1, 1937.

One 90' all-welded diesel tug for the Red Star Towing Co.; delivery date, May 1, 1937.

One all welded steel oil barge for the Barrett Co.; 97'x25'x10'; estimated delivery date, June, 1937.

DRYDOCK AND ROUTINE REPAIRS: Overhauling fleet of barges and tugs of Transmarine Corp. Minor repairs to tugs, scows, and grain boats.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Furnishing hoppers and cars for Etiwan Fertilizer Company.**

DRYDOCK AND ROUTINE REPAIRS: **U.S.L.H. tender Palmetto, yacht Peg-N'-Doby, yacht Berto, yacht Mary Otis, U.S. Quartermaster steamer Sprigg Carroll.**

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

NEW CONSTRUCTION: **65-footer** for E. E. Dickinson, powered with 2 Speedways.

Three 39-foot "play boats" for stock.

42-foot Florida guide-boat, powered with 2 110-H.P. Kermaths, for spring, 1937, delivery.

73-foot boat powered with 2 Speedways.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION: **One 175'x34' x10' tender for U.S. Lighthouse Dept.** Two triple expansion steam engines; total horsepower 1000; **keel laid July 1, 1936**; estimated delivery, April 1, 1937.

One lighthouse tender, Elm, 72' 4" x 17' 0" x 6' 6", for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. **Estimated keel laying, March 15, 1937**; delivery date, September 15, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997**, one diesel sternwheel towboat of 91 gross tons.

Hulls Nos. 1298-1299, inclusive; two self-propelled diesel pipe line dredges, Thompson and Rock Island, for U.S. Engineers, St. Paul; 3974 gross tons.

Hulls Nos. 1324-1327, inclusive; four welded flush deck cargo box barges 100' x 26' x 6'6"; 660 gross tons.

Hulls Nos. 1353-1361, inclusive: nine welded type W-3 coal barges 175' x 26' x 10'8"; 4248 gross tons.

Hulls Nos. 1362-1368, inclusive; seven welded steel oil barges 175' x 26' x 10'8"; 3304 gross tons.

Hulls Nos. 1369-1374, inclusive; six welded flush deck cargo box barges 130' x 34' x 10', for Warner Equipment Co., Philadelphia, Penn.; 2712 gross tons.

Hulls Nos. 1375-1378, inclusive, and 1384, five welded steel deck barges 80' x 30' x 9', for Pennsylvania Railroad, Phildelphia, Penn.; 885 gross tons.

Hulls Nos. 1379-1383, inclusive: five type W-3 welded coal barges 175' x 26' x 10' 8"; 2360 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; 320 gross tons.

Hull 1387; one riveted steel coal barge 170' ?" x 40' 2" x 17', for Oliver Transportation Co., Philadelphia, Pa.; 1100 gross tons.

This makes a total of 42 hulls with a total gross tonnage of 19654 tons.

ELECTRIC BOAT CO.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 25, Permit, S.S. 178, keel laid June 6, 1936; launched October 5, 1936; delivery date, March, 1937.

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936.

Hull No. 29, Sargo, S.S. 188

Hull No. 30, Saury, S.S. 189

Hull No. 31, Spearfish, S.S. 190.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, **DD381 Somers and DD383 Warrington**; keels laid June 27, 1935 and October 10, 1935, respectively; estimated launching, March, 1937, and April, 1937, respectively; estimated completion April 1, 1937.

Three destroyers, **DD397 Benham, DD398 Ellet and DD399 Lang**, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936 and DD398, December 3, 1936.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing; keel laid, Hull 143, December 16, 1936.

Two destroyers, **DD411 and DD412.**

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION: **Two barges**, 132'x30'x7'9", for carrying petroleum products in six tanks in hull or for heavy deck loading; to be built at

Chickasaw (Mobile), Alabama, yard. Launched February, 1937.

Six 1000-ton all welded steel deck barges for sand and gravel movements; length 130', breadth 34', depth 10'. To be built at Chickasaw (Mobile), Alabama, for Warner Company, Philadelphia. Delivery of three March 15, 1937; second three, April 15, 1937.

One steel cargo barge, 140' x 45' x 10. To be built at Chickasaw, Alabama, for Valley Barge Line, Tuscaloosa, Ala. Estimated launching date, April 1, 1937; delivery date, April 15, 1937.

Two steel cargo barges, 132' x 30' x 7' 9"; estimated launching date, March 27, 1937; delivery date, April 10, 1937.

Four hopper type barges, 132' x 30' x 7' 9"; estimated launching dates, April 26, 28, and 30, 1937; delivery date, May 10, 1937.

Small steel ferryboat for Waters & McCrary Gravel Company, Columbus, Miss.; 50' x 20' x 4'; estimated delivery date, March 31, 1937.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION: **One full model hull, all-welded diesel tug**, 55' long, 14' beam, 7'6" deep; 120-horsepower Fairbanks-Morse marine diesel engine; for Atlantic, Gulf & Pacific Co., New York City.

One all-welded, steel derrick barge 50' x 28' x 5'3", for Austin Bridge Co., Dallas, Texas.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank steamer**, 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated launching date, July 15, 1937; delivery date, autumn, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Clemens Reiss, J. L. Reiss, Charles C. West.**

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION: **Opon, sternwheel river steamer**, 200' x 44' x 5'6"; keel laid November 6, 1936; launched January 25, 1937.

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. Keel laid December 9, 1936.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **Five steel carfloats**, 250'x34'x9', for the Pennsylvania Railroad, to be delivered in April, May and June, 1937.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION: Contract for **Hull No. 411, Winslow (DD359)**, destroyer, launched September 21, 1936; of 1850 tons.

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and **Hull No. 416 Phoenix (CL46)** of 10,000 tons each for the U.S. Navy Department; keels laid, 1935.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359 air craft carrier CV5, Yorktown, for U. S.** Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6".

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launching date, August 1, 1937; delivery date, September, 1937.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

NEW CONSTRUCTION: **One 60-foot iron hull, all-welded V bottom boarding and fumigating vessel for U. S. Public Health Service; equipped with twin** screw Superior diesel engines. Keel laid November, 1936; launching date, March 1, 1937; delivery date, March 23, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Thos Hamilton, Battler, A. A. Denhard, Hilton, J. S. Graham, Storm King; B. & O. R. R. lighter.**

SUN SHIPBUILDING AND DRYDOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 159, 1 oil tanker (diesel), 511'x65'9"x37'; 15,800 tons; launching date, March 13, 1937; delivery date, March 22, 1937.

Hull No. 160, 1 oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, steam tankers for Standard Oil Company of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, August, 1937; delivery date, September, 1937. No. 162, launching date, January, 1938; delivery date, February, 1938.

Hulls No. 163, 164, and 165, three diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launching date, July, 1937; delivery date August, 1937. No. 164, keel laid December 15, 1936; launching date, January, 1938; delivery date, February, 1938. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two tankers for Standard Oil Co. of California; 442' x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION: **24 pontoons** 48' x 16' x 2'6" for U.S. Engineer, St. Paul, Minn.

1 steel flat 54'0" x 18'0" x 3'0", for Duquesne Light Co., Pittsburgh, Pa.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD384, U.S.S. Dunlap, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched April 18, 1936; estimated delivery, April 9, 1937.

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, June 9, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching April 13, April 30, and May 25, 1937, respectively; estimated delivery July 15, August 16, and September 15, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250', Beam 43'6", Depth 16'. Estimated keel laying, April 27, May 11, and June 8, 1937, respectively; estimated launching, August 17, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

Destroyer DD371, Conyngham, L.B.P. 334'; beam 35'; keel laid Sept. 19, 1934; launched Sept. 14, 1935; commissioned Nov. 4, 1936; estimated delivery, March, 1937.

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, July, 1937 and August, 1937, respectively.

DD402, Mayrant, and DD403, Trippe,

two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19'8"; estimated delivery, June and August, 1938.

Order placed for **DD415, O'Brien,** and **DD416, Walke,** two destroyers; delivery dates, August, 1939, and October, 1939, respectively.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn,** light cruiser, L.B.P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu,** light cruiser; L.B.P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935. Estimated launching indefinite; estimated delivery, May 1, 1938.

CL 50, **Helena,** light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

CG 69 and CG 70, **Alexander Hamilton** and **John C. Spencer,** cruising cutters for U.S.C.G. service; L.B.P. 308'; beam 41'; standard displacement 2000; geared turbine drive, express type boilers; keels laid Sept. 11, 1935; floated November 10, 1936; christened January 6, 1937; estimated completion dates, March 8, 1937, and March 29, 1937, respectively.

DRYDOCK AND ROUTINE REPAIRS: Coast Guard cutter **Campbell** arrived November 19 for completion of uncompleted work, and minor repairs and alterations. **Erie** arrived December 30, 1936, for docking, preparation for final trials, and completion of uncompleted work. **Mahan** arrived Jan. 15, 1937, for preparation, final trials, and completion of work. **Charleston** arrived February 3, 1937, for completion of work, etc.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION: **One Coast Guard Cutter;** LBP 308', LOA 327', breadth, molded, 41', draft 12'6", displacement 2000 tons. Keel laid August 15, 1935; launched January 14, 1937; estimated completion, April 15, 1937.

Order placed for **DD407** and **DD418,** two 1500 ton destroyers; no dates set.

Order placed for one harbor tug approximately 130 feet long.

UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404,** 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION: **SS179 Plunger,** keel laid July 17, 1935; L.B.P. 292'6", beam 25', loaded draft 15'; launched July 8, 1936; completed February 1, 1937. **SS180 Pollack,** keel laid October 1, 1935; L.B.P. 292'6", beam 25', loaded draft 15'; launched September 15, 1936; estimated delivery May, 1937.

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion March 1, 1938; **SS186 Stingray,** submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B.P. 302'6", beam 26'10", loaded draft 16'8".

SS192, Squalus, submarine; contract period started December 1, 1936; L.B.P. 302'6", beam 26'10", loaded draft 16'8".

Jakobson & Peterson Given Contracts

Contract for the construction of two harbor distribution or delivery boats for special harbor service has been awarded Jakobson & Peterson, Inc., Brooklyn, N.Y., by the Gulf Refining Company, N.Y. They will have a length of 55 feet, beam of 13 feet 6 inches, and depth of 8 feet. Propulsion power will be furnished by Superior diesel engines. The boats will be of steel construction throughout.

The oil company also awarded a contract to the yard for construction of four non-propelled harbor service boats, each to be 45 feet long, 28 feet beam, and 6 feet deep. They will be employed in servicing yachts and other vessels.

Dredge Contract Awarded

The La Crosse Dredging Company, Minneapolis, Minnesota, has awarded contract to the St. Louis Shipbuilding & Steel Company, St. Louis, Missouri, for construction of an 18-inch diesel hydraulic dredge, which will be 130 feet long, 36 feet beam, and 9 feet deep. It will be powered by a 1000-horsepower diesel engine to drive the pump, and a 450-horsepower diesel engine generator set to drive the auxiliaries. Jean M. Allen & Company, Chicago, Illinois, prepared plans and specifications for the dredge.

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Plans for Berkeley Yacht Harbor go Forward

Berkeley will make a strong bid for honors as one of the principal yachting centers of the Pacific Coast with the opening on May 7 of the new municipal yacht harbor, located at the foot of University Avenue. Its location is ideal in that it provides easy access either to San Francisco, via the East Shore Highway and the San Francisco-Oakland Bay Bridge, or Metropolitan Oakland by any one of many routes.

One hundred and twenty-five pleasure craft of all types already have leased berthing facilities at the harbor, and arrangements now are nearing completion for the leasing of approximately one hundred more slips. The harbor has a capacity of 300 boats, with sufficient room for expansion to twice this.

The turning basin is 1000 feet square and 30 feet deep. Wharves have been constructed, mooring piles driven, and lights installed at the harbor entrance and along the wharves. Fresh water also has been piped to convenient spots.

The breakwater, surrounding the harbor, was constructed from mud and silt obtained from dredging the turning basin, and provides adequate protection to the pleasure craft.

A repair shop has been constructed in nearby pier-shed. Three systems have been installed for taking the pleasure craft from the water for repairs. For Stars and other light boats, a boom, attached to the wharf, will be used; for boats up to 10 tons, an electrically-powered lift; and for boats up to 50 feet long, a shipway with a 10 per cent grade will be used.

As the necessity arises new shipways will be provided. Also a clubhouse and gas station soon will be in operation.

Work on the project was started approximately 14 months ago, and is expected to be completed in time for the official opening.

A gull's-eye view of Berkeley's new yacht harbor.

Bilge Club News

Southern California's big social event for shipping men, the annual banquet of the Bilge Club, has been officially set for April 3 at the Biltmore Hotel in Los Angeles. Full committees have been named to handle the event, according to Thomas B. Forster, chairman of the club.

This annual dinner of the Bilgers is the Los Angeles running mate to San Francisco's annual Steamship Dinner. Each year a number of southland shipping men go north for the San Francisco event, and in recent years an increasing number of shipping executives from the Bay city and Oakland have been going south for the Los Angeles dinner.

Formerly the Bilge Club held its dinner at the California Yacht Club in Wilmington, but need for more space to accommodate as many as 400 men resulted in shifting the event three years ago to the Biltmore.

J. H. McEachern, manager of the marine department of the Standard Oil Company, San Francisco, was a recent luncheon visitor at Bilge Club headquarters in San Pedro. He was introduced about by J. C. MacQuiddy, Standard's marine superintendent at Los Angeles harbor. Another recent guest from San Francisco was Kund Holm, freight traffic manager at San Francisco for the East Asiatic Company of Copenhagen. He was the guest of James Sullivan of Balfour, Guthrie & Company's Los Angeles office.

Propeller Club of California News

Safety Awards are Announced

Winners of the 1936 Marine Safety Contest, sponsored by the Propeller Club of California in an effort to lessen accidents among Pacific Coast seamen, were recently announced by Byron O. Pickard, contest committee.

The contest was conducted by the Pacific American Shipowners Accident Prevention Bureau and was designed to attract nation-wide attention to the safety activities of the Pacific Coast Merchant Marine.

Leading in the passenger division were the Matson-Oceanic liners; in the freighter division, the States Steamship Company; and in the steam schooner division, Hobbs, Wall and Company. All three companies will receive a bronze plaque in honor of their achievements.

Companies to receive second and third place certificates are: Freighter division, Pacific Atlantic Steamship Company, second; Swayne and Hoyt, Ltd., third; in the passenger division, States Steamship Company, second; Dollar Steamship Company, third; and in the steam schooner division, P. L. Transportation Company, second; Los Angeles-San Francisco Navigation Company, third.

In addition to the main awards there will be issued a special certificate of merit to those ships with no disabling injury to any member of the crew during the contest period. Further recognition of any exceptional safety record made during the contest will be made with the awarding of a special safety flag to be flown during 1937.

NO DISABLING INJURY CERTIFICATES

Freighter Division

Company	Vessel
States Steamship Company	California
States Steamship Company	Pennsylvania.
States Steamship Company	Texas
States Steamship Company	Washington
Matson Navigation Company	Maui
Matson Navigation Company	Manoa
Matson Navigation Company	Maunalei
Matson Navigation Company	Makawao
Matson Navigation Company	Manini
Matson Navigation Company	Mapele
Matson Navigation Company	Makua
Matson Navigation Company	Malama
Pacific Atlantic S.S. Co	San Marcos
Gulf Pacific Mail Line, Ltd	Point Lobos
Swayne & Hoyt, Ltd.	Point Caleta
Swayne & Hoyt, Ltd	Point Chico
Grace Line	Condor
Grace Line	Cuzco
Grace Line	Charcas
Matson Steamship Company	Mauna Ala

Passenger Division

Company	Vessel
States Steamship Co	General Pershing
States Steamship Co.	General Lee
Pacific Steamship Lines	Emma Alexander
Dollar Steamship Lines	Pres. Lincoln
Dollar Steamship Lines	Pres. Cleveland
Dollar Steamship Lines	Pres. Van Buren

Steam Schooner Division

Company	Vessel
Hobbs, Wall & Company	Elizabeth
E. K. Wood Lumber Co.	Olympic
McCormick Steamship Co.	West Shipper
McCormick Steamship Co.	Silverado
McCormick Steamship Co.	Brookings
Los Angeles-San Francisco Navigation Co.	Wapama
Los Angeles-San Francisco Navigation Co.	Celilo
A. B. Johnson Lumber Co.	Esther Johnson
Coos Bay Lumber Co	Lumberman

SHIPS ENTITLED TO FLY SAFETY FLAGS DURING 1937

Freighter Division

Company	Frequency
States Steamship Company:	
S.S. California	no
S.S. Illinois	4.94
S.S. Washington	no
Swayne & Hoyt, Ltd.:	
S.S. Point Caleta	no
S.S. Point Chico	3.40
S.S. Point Vincente	3.00
Gulf Pacific Mail Line, Ltd.:	
S.S. Point Lobos	2.72
McCormick Steamship Co. P.A.B.:	
S.S. West Notus	2.74
Pacific Atlantic Steamship Co.:	
S.S. San Clemente	4.94
S.S. San Lucas	2.74
S.S. San Marcos	2.91
Matson Navigation Company:	
S.S. Manoa	no
S.S. Maunalei	4.85
S.S. Makawao	3.06
S.S. Manini	3.12
S.S. Makua	3.14
Grace Line:	
S.S. Condor	no
McCormick S.S. Co.-Intercoastal:	
S.S. Chas. R. McCormick	2.98

Passenger Division

Company	Frequency
States Steamship Company:	
S.S. General Pershing	no
S.S. General Sherman	1.22
S.S. General Lee	1.21
Dollar Steamship Lines:	
S.S. President Coolidge	1.51
S.S. President Hoover	1.52
S.S. President Lincoln	no
S.S. President Cleveland	0.51
S.S. President Pierce	1.53
S.S. President Van Buren	2.80
S.S. President Harrison	0.62
S.S. President Monroe	2.74
Oceanic Steamship Company:	
S.S. Mariposa	1.04
S.S. Monterey	0.44
Pacific Steamship Lines:	
S.S. H. F. Alexander	1.45

Steam Schooner Division

Company	Frequency
Hobbs, Wall & Company:	
S.S. Elizabeth	no
Los Angeles-San Francisco Navigation Company:	
S.S. Wapama	no
S.S. Celilo	4.00
A. B. Johnson Lumber Company:	
S.S. Esther Johnson	4.15
S.S. Davenport	4.15
McCormick Steamship Company:	
S.S. Point San Pablo	5.34
S.S. Peter Helms	2.90

S.S. West Shipper 3.00
S.S. C. L. Wheeler, Jr................ 2.92

P. L. Transportation Company:
S.S. Scotia 1.85

E. K. Wood Lumber Company:
S.S. El Capitan 3.67
S.S. Olympic .... no

Coos Bay Lumber Company:
S.S. Lumberman 3.24

Hammond Shipping Company:
S.S. Eureka 3.30
S.S. Watsonville 3.20

COMPANIES TO RECEIVE PLAQUES

Freighter Division

States Steamship Company.

Passenger Division

Oceanic Steamship Company.

Steam Schooner Division

Hobbs, Wall and Company.

COMPANIES TO RECEIVE SECOND AND THIRD PLACE CERTIFICATES

Freighter Division

Place	Company
2nd	Pacific Atlantic Steamship Co.
3rd	Swayne & Hoyt, Ltd.
Passenger Division	
2nd	States Steamship Company
3rd	Dollar Steamship Lines
Steam Schooner Division	
2nd	P. L. Transportation Company
3rd	Los Angeles-San Francisco Navigation Company.

Presentation of Safety Awards!

Friday, March 5, 2:00 p.m.
Floor of Marine Exchange

A T T E N D!

President Edward H. Harms has selected Bryant O'Connor as chairman of the luncheon and entertainment committee.

The following have been named as co-workers:

Howard Oxsen
Jerome Lalor
Richard Glissman
Ben McFeeley
Bern DeRochie
Hugh Brown
Monroe Paulsen
Jack Prosser.

To the committee goes the responsible job of developing our fortnightly program. It looks like a big year ahead, mates!

The attractive young lady is displaying the Matson award in the Safety Contest to winning ship operating lines.

Captain Blackstone Addresses Club

● **February 23 meeting**

Speaker of the day Capt. Henry Blackstone discussed "P. and I. Insurance and Accident Prevention Aboard Ship." On display were plaques and certificates of merit which will be presented to the winners of the Marine Safety Contest sponsored by the club.

Byron O. Pickard was a deft chairman of the day, introducing the speaker as an active worker in the cause of accident prevention. Chairman Pickard reviewed the work done by the Shipowners' Safety Bureau—complimenting several members present for their participation.

Captain Blackstone traced the history of marine insurance from its source. Quoting our old friend Jim Quinby, he credited Noah as engineering "the first tourist floater in history." Factually, marine insurance had its origin in the days of the Phoenician traders several centuries B.C., according to speaker Blackstone. Originally, merchants accompanied their cargoes to sea. In time this was more and more impractical. The result: a form of protection which was the crude beginning of modern-day marine insurance. Incidentally, it was interesting to hear that there is in existence a policy issued by Lloyd's dated February 13, 1613.

"P. and I." to the marine world means Protection and Indemnity. This development came with the necessity of protecting shipowners against perils not covered in the standard form of hull insurance. It is an outgrowth of the owners' own mutual insurance, and the present system of P. and I. insurance covers all of the grief that a ship is heir to . . . not already covered in the hull policy.

Fourteen points of the P. and I. policy were enumerated—with emphasis on such features as liability for hospital, medical, and similar expenses due to crew injuries or illness, and liability for loss of life to any person aboard the ship.

A very comprehensive talk . . . which the club membership appreciated roundly!

FLASH!

As we go to press . . . two important news items reach us:

C. M. "Dad" Le Count has been named vice-president of the club, filling the vacancy caused by the elevation of Edward Harms to the presidency.

Paul Faulkner has been named chairman of the membership committee, heading up a competent group of "dotted line" purveyors. The personnel of the committee will be published next month.

Personals

Frank Hollyday, who had been associated for about twenty years with the firm of Jas. Griffiths & Sons, Seattle, passed away in San Francisco on January 22 after a short illness. He had been in charge of the company's local offices for some time, and was well known to shipping and grain officials.

Another obituary we have to record is that of **Captain H. Hansen**, of the Coast Guard cutter Alert. Captain Hansen passed away in Ketchikan, according to advices received by the marine department of the San Francisco Chamber of Commerce.

Captain A. V. R. Lovegrove recently retired from the post of commander of the Canadian Pacific liner Empress of Asia, at the age of 60, and has been succeeded by Captain **George Goold**, formerly of the Empress of Russia. Captain Lovegrove had served for 26 years as a licensed officer on transpacific ships of the Canadian Pacific, and was presented with a set of matched golf clubs, an engraved mantel clock, and other articles, by his friends. He expects to return to England.

Terence P. Cook, who has been with the Barber Line for many years, has been appointed Far East traffic manager, succeeding **E. D. Clarity**, the latter having been incapacitated by illness during the last few years, according to advices received by the company.

At the regular meeting in New York of the directors of Todd Shipyards Corporation recently the following were elected: **William A. Maloney**, vice-president in charge of sales; **Francis J. Gilbride**, vice-president of the Robins Dry Dock and Repair Company, director; **C. H. M. Jones**, assistant to the president; **E. P. Enfer**, comptroller; and **William J. Sammon** and **Henry Frielinghaus**, assistant comptrollers.

At the recent meeting of the board of managers of the American Bureau of Shipping, **Basil Harris**, vice-president of International Mercantile Marine Company, was elected a member of the board.

Ship Sales. February brought a swarm of ship sales on the Pacific Coast. Most important is the purchase by Matson Navigation Company from the Tacoma and Oriental Steamship Company of their five remaining ships. These are: Seattle, Olympia, Grays Harbor, Tacoma and Shelton. The first four are approximately 7000 gross tons each, and were all built at the Skinner and Eddy yard, Seattle, in 1919. Shelton, of 6,062 tons gross, was built at Bay Point, California, in 1920. Names have been changed as follows: The Seattle is now the Likue; the Olympia is the Hamakua; the Grays Harbor is the Honomu; the Tacoma is the Ewa; and the Shelton is the Kahuku.

Matson has purchased also from the Oceanic and Oriental S.S. Company two freighters, the Golden State and Golden Bear, which have been renamed respectively the Lahaina and the Kailua.

Other ship sales include:

Swayne & Hoyt's Point Arena, Point Gorda, Point Bonita, Point Montara, Point Reyes, and Point Sur, to the newly formed Coastwise S.S. Company, of Portland;

States Line's New York, to the Waterman Steamship Corporation;

Mexican Mail's Sonora, to the Keene Line;

Matson's City of Los Angeles and Enterprise, to Japanese scrap interests;

Nelson S.S. Co. (trustee), Democracy and Sacramento, to Swayne & Hoyt; Sutherland to Alaska Packers. Price $90,000 for each ship; measurement each ship, 4,700 gross tons.

99% Fire Proof Ship

(Continued from Page 43)

the spaces with CO_2 gas manually controlled from a location outside the machinery spaces. Lamp rooms and paint storage lockers are equally protected by CO_2 gas smothering devices, the alarm of fire being given by the thermostats installed therein, which record in the pilot house.

The contract plans and specifications for the reconditioning of the vessel were prepared by Gibbs & Cox, Inc., naval architects and engineers, under whose supervision all work in connection with the ship was carried out.

The design of the fireproof construction for interior spaces was developed by J. Philip Kiesecker, of New York City, who acted as consultant for the shipyard, and also designed all architectural features for passenger quarters and public spaces and handled the decoration and furnishings for the owners.

Book Review

The Motorship Reference Book for 1937. 300 pages profusely illustrated and with many insert drawings, bound in light blue buckram with black stampings, published by Temple Press Ltd., London; Price 5s, net.

This is the 13th annual edition of a very useful compilation of data concerning the seagoing motorships of the world's merchant marine fleets, and is of considerable interest to those associated in any way with the building and operation of motorships. One section gives details of every oil-engined vessel in service, excluding those of under 2,000 tons gross, up to January, 1937.

As in previous editions, the chapters including descriptions of all the well-known main and auxiliary diesel engines have been revised, and particulars are included of the most up-to-date units built, to the end of last year. The illustrations include large numbers of sectional drawings of diesel machinery, apart from photographic reproductions.

There has now been added a chapter which describes in detail the reversing controls of marine diesel engines, and this represents information which applies to the very latest types of large engine.

There are now afloat over 12 million gross tons of motorships, and 2 million more gross tons of vessels now on order or under construction are designed for diesel engine propulsion. This book is the most comprehensive publication covering the oil-engine plants of seagoing merchant ships.

Review of Progress of Lighthouse Service, Eighteenth District

The eighteenth lighthouse district, which includes some 800 miles of the Pacific shore line, comprises the entire State of California. Although California was visited, and its shore line explored to some extent by Juan Rodriguez Cabrillo in 1542, some 78 years before the landing of the Pilgrim Fathers, there was but little commerce on the coast until after the acquisition of the territory by the United States from Mexico in 1848, and it was not until 1850 that an act of Congress authorized the establishment of six lights on the Pacific coast, most of which were established and placed in commission in 1855. The first of these lights was that at Alcatraz Island in San Francisco Bay, which was placed in operation in 1854. This island was taken over a few years ago for a Federal prison, and the three lightkeepers at the station, who maintain a light and two fog signals, are now required to endure some of the rigors of Federal discipline necessary for the proper control of a considerable number of former public enemies.

The California shore line in general is very rugged, with deep water close inshore, and for that reason aids to navigation are separated more widely than in many of the other districts. Most of the early lights established were of the first order, intended to serve a considerable section of the coast line, and there are at present nine of these lights in the district. These first lights were established during the oil-wick period of development. They passed through the oil-vapor-lamp period, and most are now equipped with electric lights, with power furnished either from commercial sources or generated at the stations. The earliest fog signal in the district was a 6-inch smooth-bore iron cannon installed at Point Bonita Light Station at the entrance to the Golden Gate and fired at intervals during foggy weather.

● Mare Furiosum

Sir Francis Drake, who made extensive explorations on the Pacific coast from 1577 to 1578, reported that they encountered severe storms in the Pacific, and he expressed the opinion that instead of "mare pacificum" it were better named "mare furiosum", and present-day travelers often find conditions much the same. While tropical storms of the type frequently visiting the Atlantic coast do not occur in this part of the Pacific, there are, nevertheless, severe gales during the winter months which sometimes approach hurricane force, and during the summer months there is a persistent northwest wind along the coast which frequently reaches high velocities, although unaccompanied by storm conditions. Point Reyes Light Station, located at the outer end of a rugged peninsula, about 30 miles northwest of San Francisco, holds the record for the greatest annual air movement on the Pacific

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Eighteenth Lighthouse District

(Continued from Page 59)

coast, the Weather Bureau reporting that the maximum annual air movement at that place, shown by their records, was 205,884 miles in 1915. This is equivalent to a steady wind of 23.5 miles per hour throughout the year and suggests some of the difficulties experienced by the keepers at that station in maintenance of grounds and buildings. The wind velocity at this station seems to be accentuated by its peculiar location, and winds of more than 80 miles per hour are not uncommon occurrence during clear weather. The maximum clear weather velocity of the northwest wind recorded by the Weather Bureau at this station was 91.3 miles per hour with a clear sky, in May 1895. During such times the keepers are ocasionally marooned in the light tower and experience difficulty in negotiating a trip over the bridge connecting the tower with the adjacent fog signal building.

● Frequent Fog

Off the coast of California prolonged fog is of frequent occurrence during the summer months, and occasional fog occurs throughout the year; these are known as "outside fogs" and seldom occur as low fogs inshore. except close to the shore line. During the winter, "tule", or inshore fogs are of frequent occurrence. The prevalence of fog requires many signals for the protection of navigation, and these signals comprise a considerable part of the operation and maintenance work. During the fiscal year 1934 Point Reyes Light Station recorded 2,360 hours of fog, which is the maximum for the district.

The greatest progress made in the improvement of lights has been through increasing the intensity by use of commercial or station generated electric current. Only 11 attended stations now use other illuminants, 9 of which are still equipped with incandescent oil vapor lights. The use of acetylene lights has been considerably extended, 14 new establishments having been made recently, including 10 of the outlying islands off the southern coast of the State. At the more isolated of these stations, pressure regulators with cut-over devices and with two banks of acetylene accumulators have been provided to reduce the number of trips of the tenders for recharging these stations. With the exception of the upper Sacramento River, where flood conditions will not permit, practically all post and lens oil lanterns have been replaced with acetylene or primary battery operated electric lights. Fifty battery-operated channel lights and 18 battery-operated range lights have been established recently to mark the dredged deep-water channel below Stockton in the San Joaquin River. Battery operated railway signal lights, of approximately 11,000 candlepower, have been found efficient for short range-light service at a low upkeep cost.

Battery-operated electric lighted buoys have been established in the San Francisco main channel crossing of the bar, where acetylene buoys cannot be efficiently maintained on account of breaking seas, and these are giving very satisfactory service. There are in the district at the present time 68 lighted buoys without

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fog signals, 19 lighted whistle buoys and 25 bell and gong buoys. A considerable number of new establishments of lighted signal buoys are projected.

● New High Powered Lights

At the Santa Barbara and Point Arguello Light Stations where former light towers were destroyed, the new lights are double-ended 36-inch revolving airway beacon lanterns. At the Santa Barbara Station, one such lantern was installed, and at Point Arguello two lanterns, one mounted over the other. These lights have been mounted on substantial galvanized steel towers, and each furnishes a flashing white light of 1,200,000 candlepower at a very moderate cost, since commercial current is available at both stations. At the Santa Barbara Light Station the revolving beacon is mounted on an enclosed steel tower with drive motors and fully automotic control equipment located in the top room of the tower. This apparatus is so connected that should the lens stop, light burn out, lamp changer fail to operate, or comercial electric power fail, an alarm horn will sound.

● Radio Beacons and Sound Signals

There are now in this district 38 light stations with resident keepers, and at 21 of these, larger types of diaphone fog signals have been installed. At four of these stations, where it is necessary to cover large arcs and provide greater range, double diaphones, sounding simultaneously, are in operation. Radio-beacon aids to navigation have been established at seven light stations and on two lightships in the district, and all have been synchronized with the sound fog signals for distance-finding purposes. The radiobeacon station on Blunts Reef Lightship, which was the first one established in this district, was synchronized with the diaphone fog signal for distance finding on July 15, 1930, utilizing synchronizing equipment designed in the district office. Very gratifying reports have been received from shipmasters of results obtained from this and other distance-finding stations. At two stations in this district the radio alarm unit is so connected that all telephones of the intercommunicating telephone system will ring, in addition to the sounding of an alarm horn located at the radiobeacon house, in the event of failure of the radiobeacon to transmit normal strength signal at the scheduled times.

All steam tenders and lightships in this district have been converted to oil burning, and in addition one Diesel electric tender and one Diesel electric lightship are maintained. In keeping with modern trends, the crew's quarters in the two older tenders in the district have been remodeled to provide separate mess rooms, forced draft ventilation, and other facilities for increased comfort.

Considerable attention has been given during the past few years to increased fire protection at all light stations, and at present the majority of stations are equipped with high tanks where sites at suitable elevations are available, or with high pressure pumps. Owing to the fact that no rain occurs in the district during the summer months, many stations are equipped with rainsheds for the purpose of collecting and storing sufficient water to carry through the dry season,

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In Addition to **STOPPING** Leakage in Caulked Decks thru Installation of

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We are also prepared to insulate against heat and cold on all interior surfaces in crew quarters with Case Cork Mastex, and install Magnesite, Case Mastex or Tile for protection of floors.

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WORLD'S LARGEST DIESEL FIREBOAT

to be A-E-CO Equipped

The fireboat, FRED A. BUSSE, being completed by the Deloe Boat & Motor Works for the City of Chicago will be the world's largest and most modern Diesel type. Included in her equipment are one A-E-CO Type HA electric steering gear and a 10" pedestal-mounted electric gypsey, driven from below deck by a 5 h. p. motor. Gypsey capacity is 3000 pounds at a line speed of 30 f.p.m.

John G. Alden, of Boston, Mass., were the designers.

Steering Control Unit for Pilot House installation

A-E-CO Electrically Driven Type HA Steering Gear

A-E-CO MARINE Auxiliaries

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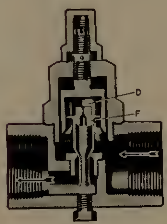
FREIGHT OFFICE: 19 STATE STREET, NEW YORK

the economical use of water being of prime importance.

There are three lighthouse depots in the eighteenth district, the principal of these being located on Yerba Buena Island, in San Francisco Bay. The depot at Los Angeles was established in 1934 and materially increased the efficiency of the district by providing a base for operations on the southern coast of California, greatly reducing the number of long voyages which the tenders must make. Emergency relief funds provided for the construction of this depot and for important improvements at Yerba Buena Depot, access to which has been facilitated greatly by the San Francisco-Oakland bridge, which crosses the lighthouse reservation.

A Unique Impulse Steam Trap



In this steam trap, illustrated herewith, a unique operating principle is employed to open and close valve F, the only moving part in the trap. A small part of the condensate is by-passed into discharge side of trap; this fractional part of the main discharge, called the control flow, passes through two orifices in series with a closed chamber between the orifices. The first orifice is the small clearance around top flange of valve F, the second orifice is the small hole in center of valve. Variations in temperature of the condensate cause changes in pressure in control chamber D, and these changes in pressure move valve F up or down, as required.

At low or medium condensate temperatures the bypass flow through center orifice reduces pressure in chamber D sufficiently to permit valve to be raised by the line pressure in trap inlet and the main discharge passes through trap seat. As temperature of the condensate approaches steam temperature, a portion of the hot water flowing through center orifice flashes into vapor because of the reduced pressure in outlet side of trap. This flashing causes an increase in volume that chokes the flow at this point and builds up the pressure in chamber D sufficiently to force valve F down on its seat, thereby cutting off the main discharge. When condensate collects, the trap opens to discharge all except the very hottest water.

Additional features of the Yarway Impulse Steam Trap that are especially useful in marine service are small size (½-inch trap is only 2¼ inches long), light weight (½-inch trap weighs only 1⅛ lbs.), simplicity of installation and minimum requirements in spare parts. The six sizes, ½ inch to 2 inches, are made entirely of bar stock, and are factory set to operate at all pressures up to 400 pounds in bronze fitted types; up to 600 pounds in stainless steel fitted types. For special marine installations Yarway Impulse Traps are furnished with flanged ends. The Yarway trap is a product of Yarnall-Waring Company, Chestnut Hill, Philadelphia, and the California representative is Frank E. Witte Co. of San Francisco.

Personals

Captain Stanley H. Thompson, whose regular post is chief officer of the Panama Pacific liner Pennsylvania, under Captain Harold L. Winslow, sailed as captain of the American Shipper when that vessel left New York recently. He relieved the ship's regular commander, Capt. Robert J. Sullivan, who took a voyage off. Captain Thompson made his first voyage as a commander when he took the United States liner American Traveler from New York a short time ago. **John M. Hultman,** who was regular first officer of the Pennsylvania, assumed Capt. Thompson's old post when the vessel sailed from New York for the Pacific Coast.

Grace Line, through **Guy E. Buck,** district manager, announces the appointment of **James R. Clark** as foreign freight representative for the line. Clark succeeds **Roy N. Millice,** who resigned to go with Otis McAlister & Co. in a foreign post. Prior to his appointment, Clark was cashier of the line during his five years' connection.

Mackay on Coastwise

W. V. Russ, Pacific Coast manager for Mackay Radio, announces that his firm will maintain radio communication service aboard the six cargo steamers of the newly-formed Coastwise Steam Ship Company, of Portland, Oregon. Mackay operates a major high powered marine coastal station at Portland, the home port of this new line.

Cadogan to Inspection Post

Captain J. J. Cadogan, master of the Dollar liner President Cleveland, has resigned his position in order to accept the position of Assistant Inspector of Hulls in the United States Bureau of Marine Inspection at Seattle. Succeeding him on the Cleveland will be **Captain Charles Jokstad,** formerly in command of the President Monroe. Captain Cadogan has been connected with the Dollar Line since the organization of its round-the-world service, and has been a very popular member of the staff.

H. F. McCormick Mourned

We regret the recent death in Portland of one of the outstanding figures of the Pacific Coast lumber and steamship industries—**Hamlin F. McCormick,** who succumbed after a short illness. He had been known in industrial circles of the West for nearly forty years, and was president of the St. Helens Wood Products company and chairman of the Board of Directors of the St. Helens Pulp and Paper Company at the time of his passing.

Mr. McCormick, with his brother, **Charles R. McCormick,** organized the Charles R. McCormick Lumber Company, from which later developed the McCormick Steamship Company. He is survived by his widow and brother.

PACIFIC MARINE REVIEW ADVERTISERS

PACIFIC MARINE REVIEW

Official Organ

Pacific American Steamship Association

Shipowners Association of the Pacific Coast

APRIL 1937

In this issue:

Comprehensive Up-to-the-minute History Chart the American-Hawaiian Steamship Company, Williams Steamship Corporation, and the Oceanic Oriental Navigation Company by periods from 1899 to 1936 inclusive. *(Facing Page 32)*

PACIFIC MARINE REVIEW

APRIL, 1937

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PACIFIC MARINE REVIEW

VOLUME XXXIV — APRIL 1937 — NUMBER 4

Editorial Comment

Almon E. Roth "takes over".

The New Comptroller of Pacific Shipping

At the present writing, two organizations jointly represent the shipping industry of the Pacific Coast in contact with its employed personnel. These are the Waterfront Employers Association and the Pacific American Shipowners Association. The experience of Pacific Coast shipowners and stevedores during recent years has taught them the value of new opinions from unbiased sources bearing on their own problems in connection with organized labor. They therefore decided to more firmly amalgamate their joint interests, and so set up a union composed of two organizations that could act either jointly or independently, as the circumstances indicated, and would be under the control of one executive, who should not be chosen for his ship operating experience but for his ability to solve public relations problems and to reconcile diverse points of view.

The Pacific Coast shipping executives therefore sought such a man, and are satisfied that they have found what they sought in the selection of Almon E. Roth, for 18 years comptroller of Stanford University. So on March 10 Mr. Roth entered on his new duties as president and executive manager of these two associations, with headquarters at San Francisco.

Mr. Roth has never before had any connection with shipping. Born in the Middle West, he was brought to California by his parents at the age of four and settled in Ukiah, where he was educated in the public schools and worked during vacations in the forests and the lumber mills of northern California.

He entered Stanford University in 1908 and worked his own way through that institution, waiting on table and doing chores through the college terms and working on various construction projects during vacations. He played on the varsity football squad and was a member of the relay team in track. His course was in law, and after graduation in 1912 he practiced law in San Francisco for seven years, during part of which he specialized in admiralty practice.

In 1919 he was appointed by the board of regents to be comptroller of Stanford University, a position which he has successfully filled for the past 18 years and which he voluntarily resigned to take up his present duties.

As comptroller, Mr. Roth was virtually business manager for a business involving at least 5,000 resident personnel and many more non-resident but actively interested adherents. During his incumbency of this "man sized" job he had many conflicting points of view to reconcile, and achieved a fine reputation as a "fixer" of college personnel problems. He found time also to do a great deal of similar work in the California State Chamber of Commerce, of which he was vice president, chairman of Committee on Government Expenditures, and member of Committee for the Better Administration of Justice; and in Rotary, where he rose to be president of Rotary International, and presided over the Rotary International conference held in Vienna in 1930. In this latter connection he was very successful in solving some of the difficult problems confronting Rotary at that time in several of the European countries and in Mexico.

Almon E. Roth generates confidence and esteem in all with whom he comes in contact. He evidently accomplishes this because of his own sympathetic understanding and sincere good will. His experience and his character indicate the highly successful conduct of his present duty, which is to harmonize the shipping industry with the maritime labor unions on the Pacific Coast.

A Prize Contest in Welded Ship Design

The James F. Lincoln Arc Welding Foundation is sponsoring a world-wide contest for papers on redesign or new design of machine, structure, building, etc., wherein arc welding is used in whole or in part, or on organizing, developing and conducting an arc welding service.

Papers must be in the mail not later than June 1, 1938, and in the hands of the James F. Lincoln Foundation not later than July 1, 1938.

The cash prizes in this contest total $200,000. Any person or group of two or more persons may enter one paper per person or group.

This contest is of particular interest to the marine fraternity because one of the main classifications (of which there are eleven) is class D for Watercraft. D is divided into two sub-classifications, D-1, Watercraft—Commercial; and D-2, Watercraft—Pleasure. Each of these sub-classifications has five cash prizes: $700, $500, $300, $200, $150. The four papers adjudged best under classification D get additional cash prizes of $3000, $2000, $1000, and $800 respectively.

The four best papers in the entire contest get additional cash prizes of $10,000, $7500, $5000, and $3500. So that the total grand prize for the best paper would be $13,700.

Papers not winning a prize, but of merit enough to obtain honorable mention, are to get a payment of $100 up to the number of 178 papers.

Here is an excellent opportunity for naval architects, marine engineers, and marine welders to gain for themselves substantial rewards in fame and fortune and at the same time advance their own information and that of their profession.

Master of Your Ship

The January-February number of "The Ships Bulletin," issued by the marine department of the Standard Oil Company of New Jersey, carries a strong message to ship captains under the above head.

R. L. (Bob) Hague is well known in Pacific Coast maritime circles, and his many friends will appreciate this message as another evidence of his executive ability and broad minded vision.

Hague is managing operator of the largest fleet of tankers. To his many shipmasters scattered over the seven seas he writes:

"Years ago, in the days of sail and early steam, a vessel having started on her voyage was under the sole direction of her Master. His was the command, and his the responsibility to determine what course to follow and, in emergency, what action to take.

"Times have changed. The development of radio and other means of rapid communication have made it possible for the Master to keep in close touch with his home office, and the office to keep in close touch with him. The benefits of these developments are obvious; but, at the same time, there is the temptation, when any problem arises, to defer the responsibility of decision to the home office.

"The captain is still legally the Master of his vessel. She and her cargo, together with the safety of her personnel, are still his responsibility.

"While naturally the Masters of our vessels are asked to keep the home office informed of any and all developments of consequence, nevertheless this in no way relieves them of their legal responsibility under any circumstances. They are expected to command their ships with the same self-assurance and good judgment for which the 'old timers' have been noted and so much admired."

To the master of any ship reading these words there should come a lifting of his shoulders, a straightening of his spine, and a stiffening of his morale. The legal, moral, physical, and spiritual leadership are his in a little world where he is supreme over crew and passengers. That a large proportion of shipmasters actually measure up to such responsibility is proof of the selective ability of ship management and of the great capacity of the human race.

Pacific Marine Review, April, 1912

The 4th number of the 9th volume of Pacific Marine Review, First Established and only Exclusively Marine Paper published on the Pacific Coast, was issued on the 15th of April, 1912, from its office at 379-380 Arcade Annex, Seattle, Washington.

In this number's lead article "Pacific Marine Review again urgently and strongly recommends that the American ship should be given its just dues in passing forever free through our Interocean (Panama) Canal, built for and by the American people, of their money, and through their genius and enterprise, which other nations attempted but failed to accomplish. Pacific Marine Review declares that the traditional policy of free waterways, fundamental with the American people, should be extended to both offshore and coastwise trades through the Panama Canal for American vessels of every class and type."

The Terry Steam Turbine Company announced that they had recently sold to the Oceanic S. S. Co., for steamers Ventura and Sonoma, two 100 H. P., 2600 r. p. m. Terry turbines direct connected to Jeanesville boiler feed pumps. This order was placed after exhaustive tests of similar equipment on S. S. Sierra.

The editorial page deals with the weakness of our marine engineer licensing system as compared with that of the British Board of Trade, and concludes as follows:

"Awake, America! Awake! Educate thy lawmakers to the essentiality of maritime affairs of this wonderful and great country, of which the maritime laws, as they now stand inadequate and antiquated in their obscurity and dullness, are truly a farce."

A report from the Committee of Merchant Marine and Fisheries of the House of Representatives of the Sixty-Second Congress (on a number of bills proposing free entry of ships and shipbuilding materials, and then pending) showed that at that time there were less than 1,000,000 tons of shipping engaged in foreign trade under the American flag.

"With keen interest and some satisfaction we note the announcement of an international conference to be held in London, England, this autumn to discuss the vital question of the load line and its international adoption."

A Nippon Yusen Kaisha circular offers generous rebates of 5 per cent and 10 per cent on freights contributed by those who confine their shipments to that line for certain specified periods. This applied to all shipments from Singapore, Penang, and Malay Peninsula, to Europe, with the exception of rice, hemp, tobacco, or treasure.

The Seattle Construction & Dry Dock Company, on March 21 and March 27, had launched the Star II and the Star III, steel whalers 105 feet long equipped with 400 H. P. triple expansion steam engines, and capable of making 12 knots at sea.

The U. S. Engineers had a project for 30 foot minimum depth from Portland to the sea, and M. Talbot, general manager of the Port of Portland Commission, was building a new steel hull, 30 inch, suction dredge to assist in this work.

An article on the Dahl mechanical system of oil burning gives some very interesting figures of the savings effected by an actual installation as compared with coal burning.

"Steamer City of Para. Old installation, pounds of coal per indicated horsepower hour, 2.32. Dahl system, pounds of oil per indicated horsepower per hour, 1.259. This makes a saving in weight of fuel consumed per horsepower hour of 45.7 per cent."

There were 26 pages of informative editorial material in that issue and 18 pages of advertising.

Alaska Packers Association's Fleet Sailing for Alaska, 1912

Vessels	Gross tons	Destination—
4-m Barks—		
"Star of Greenland"	2148	Fort Wrangell
"Star of Lapland"	3381	Bristol Bay—via Puget Snd.
"Star of Scotland"	2293	Karluk
"Star of Zealand"	3292	Loring
Ships—		
"Bohemia"	1633	Bristol Bay--From Puget Sd.
"Indiana"	1488	Bristol Bay
"L. J. Morse"	1394	Bristol Bay
"Santa Clara"	1535	Alitak
"Star of Alaska"	1716	Chignik
"Star of France"	1644	Bristol Bay
"Star of Italy"	1644	Bristol Bay
"Star of Russia"	1981	Cook Inlet
"Tacoma"	1739	Bristol Bay
Barks—		
"Star of Chile"	1001	Bristol Bay
"Star of England"	1943	Bristol Bay
"Star of Finland"	1571	Bristol Bay—Via Puget Sd.
"Star of Holland"	2131	Karluk—Via Puget Sound
"Star of Iceland"	1981	Bristol Bay
"Star of India"	1381	Bristol Bay
"Star of Peru"	1027	Bristol Bay
Barkentine—		
"Centennial"	1287	Bristol Bay
Schooners—		
"Metha Nelson"	460	Kodiak
"Premier"	308	Bristol Bay--From Puget Sd.
"Prosper"	241	Bristol Bay--From Puget Sd.
Steamers—		
"Alitak"	115	Chignik
"Chilkat"	173	Ft. Wrangell
"Jennie"	128	Cook Inlet
"Kadiak"	114	Bristol Bay
"Kvichak"	1064	Bristol Bay
"Nushagak"	681	Bristol Bay
"Unimak"	258	Karluk

Telephone: BOwling Green 9-7917

Intercoastal Steamship Freight Association

80 Broad Street, New York

THE PETTENGILL BILL

Under the Interstate Commerce Act, a railroad cannot charge more for a short haul than for a long haul over the same route, when the short haul is a part of the long haul, without first securing the permission of the Interstate Commerce Commission. H R 1668, known as the Pettengill Bill, now pending in the House of Representatives, proposes to repeal this protective requirement.

Commissioner Eastman of the Interstate Commerce Commission has characterized this proposed repeal of the long-and-short-haul clause as a "reversion to the jungle". It would permit the railroads once more, as in years long past, to cut rates wherever water competition occurs until that competition has been paralyzed, at the same time making their rates where water competition does not exist high enough to insure a profitable operation of their business as a whole.

The House Committee on Interstate and Foreign Commerce has approved the Pettengill Bill by a vote of 15 to 8.

It has come to the attention of this Association that certain shippers and associations are being quoted in Congress and elsewhere as in favor of the Pettengill Bill whereas actually they are opposed to it. If in your opinion the Pettengill Bill should not be enacted into law please let your Congressmen and Senators hear from you at once.

INTERCOASTAL STEAMSHIP FREIGHT ASSOCIATION

Harry S Brown

Chairman

The Long and Short of It

Some Excellent Reasons Why the Pettengill Bill Should Not be Enacted into Law

By Harry S. Brown,
Chairman, Intercoastal Steamship Freight Association

The purpose of the Pettengill Bill is to repeal the long-and-short-haul clause of the Interstate Commerce Act.

Briefly stated, the long-and-short-haul clause prohibits a rail carrier from charging more to one person for a portion of a certain transportation service than it charges to another person for the entire transportation service. The rail carrier may not sell a whole cake to one person for less than it charges another person for half the same cake.

That the principle of the long-and-short-haul clause is sound seems hardly open to question among reasonable men. During the history of the administration of the Interstate Commerce Act for fifty years, it has been proved beyond a shadow of doubt that the enforcement of the principle of this clause is essential to any ordered system of rates.

In the words of Commissioner Eastman of the Interstate Commerce Commission, the Pettengill Bill if enacted into law will constitute "a reversion to the jungle." Testifying last month before the Committee on Interstate and Foreign Commerce of the House of Representatives in opposition to the Pettengill Bill, Mr. Eastman stated:

"Of course the charging of a higher rate for a shorter haul than for a longer over the same route in the same direction is merely one form of discrimination, or what the law calls undue preference and prejudice. However, the Congress regarded this as a particularly aggravated or flagrant discrimination, and for that reason it dealt with it specially in the Act and subjected it to a special prohibition. That special prohibition, which goes back to 1887, when the original act to regulate commerce was enacted, was in response to a very strong and outraged public opinion at that time."

At the same time that this testimony was given, Mr. Eastman stated that the Interstate Commerce Commission and every one of its members was definitely opposed to the Pettengill Bill.

The United States Maritime Commission, which performs for water carriers the functions which the Interstate Commerce Commission performs for rail carriers, is also definitely on record against the bill, as a Commission and each member individually.

The principal argument which is offered in support of the Pettengill Bill is that it will enable the railroads to take from carriers by water certain traffic which those carriers now enjoy because of their ability to furnish a cheaper and more efficient service than the railroads. It is, of course, well known that where water transportation may be available, it is more cheaply obtained that rail transportation. The costs of running a ship are less than the costs of running a railroad train carrying the same freight.

The effect of the Pettengill Bill would not be to create any new traffic, but simply to leave the railroads free to make fighting rates against competing water carriers in an effort to drive the water carriers out of business. The water carriers would not have legitimate complaint against such fighting rates provided they were reasonably compensatory, and under the existing law the rail carrier is permitted to secure relief from the long-and-short-haul clause and make such rates where they are reasonably compensatory. The removal of the long-and-short-haul clause, however, would enable the railroads to make these fighting rates at levels below what would yield a reasonably compensatory return; thus the burden of carrying that traffic would be placed upon the rail rates between points where water competition does not exist. It is easy to see that, if the railroads be permitted to do this, they can, with their great resources, drive water competition out of business, and as soon as this competition is removed the rate will return to a level far above what it was before. This is an ancient device which has been exploited and condemned time and again in the past, and it scarcely seems creditable that we should have to fight this old battle over again today. Truly it may be said with Commissioner Eastman that the Pettengill Bill would take us back to the practices of the jungle.

The railroads say that the long-and-short-haul clause has become obsolete, and that aside from this clause the Interstate Commerce Act contains adequate safeguards to prevent reversion to the jungle. It is sufficient to say in answer to this argument that the Interstate Commerce Commission, by its definite stand, very plainly believes that this is not so. Furthermore, the very fact that the railroads so much desire the repeal of the long-and-short-haul clause gives the lie to the argument.

There are, of course, exceptional cases where relief to the railroad from the strict application of the long-and-short-haul clause is desirable and proper. In such cases the railroad is free under the present law to make application to the Commission, and it is a matter

of history that the great majority of such applications have been granted by the Commission. The railroads acknowledge this, but state that the procedure which the Commission has adopted in these matters is voluminous, time consuming and expensive. This perhaps is true, but surely it is absurd to suggest that the way to correct a cumbersome procedure is to abolish it altogether. The honest and reasonable thing to do is to study the procedure and devise a means of correcting it. In that effort, we think the railroads should be assisted. Indeed the Interstate Commerce Commission itself has suggested changes in the law to make this possible.

The Western states are vitally interested in the transportation industry, both by land and sea. Any reversion to the practices of the jungle in this industry is bound to affect them most detrimentally. Indeed the Hon. Samuel B. Pettengill, member of Congress from Indiana, author of the bill bearing his name, apparently expects this result and considers it desirable, for in an article appearing in the December issue of one of the nation's leading business magazines, claims that the effect of his bill would be to develop the interior of the country by slowing down the development along the seaboard.

For these reasons, it is submitted that all persons, businesses, industries, and others having an interest in transportation should go on record as opposing the Pettengill Bill, H.R. 1668, 75th Congress.

Eastman on the Pettengill Bill

Most striking, important, and unanswerable testimony against this bill has been offered by Joseph B. Eastman, member of the Interstate Commerce Commission, speaking before the House committee on behalf of the whole Commission. A brief summary of that testimony, setting forth the striking conclusions, is herewith presented.

I have undertaken to show you—

First. That the long-and-short-haul clause has been part of the law for 50 years; that it was enacted in response to strong and outraged public opinion to correct an abuse which had become widespread; and that this agitation persisted for many years until the original defects in the section had been remedied. A law with such a history ought not lightly to be repealed or emasculated.

Second. That it is proposed to substitute for this clause an untried provision which, it can be argued, could conceivably be used to produce much the same results. If this is true, there is no sense in making the change. It is clear, however, that those who favor the bill do not believe it to be true, because they confidently urge that it will produce very different results. They have reason for this belief, because the Commission and the courts would find it difficult to avoid the conclusion that Congress, when it changed the law, intended also to change the policy and the results, and because, in any event, the Commission would encounter very great, and probably insuperable, practical difficulties in applying the present policy and producing the present results.

Third. That while there may, perhaps, be some reasonable ground for complaint because of delay in the administration of the fourth section in certain cases in the past, the present administration is expeditious. If it is desired to insure expedition in the future, this can be done by providing the same time limit as in suspension cases.

Fourth. That the chief reason offered for the bills is that it will have the result of enabling the railroads to compete more freely with other forms of transportation and thus add largely to their revenues and employment. Upon analysis it is clear that it is from the water carriers that this traffic is to be taken. The bill is directed chiefly against them. The facts are that the Commission has been liberal in granting fourth-section relief to enable the railroads to compete with water carriers. The complaint that it has not been liberal centers on transcontinental rates and the competition of the intercoastal water carriers. The facts are that the Commission had good reason for denying relief in the case of these transcontinental rates; but even had it been granted, not enough traffic is involved to affect appreciably the earnings of the western railroads, especially when the reductions in rates which would undoubtedly be made by the eastern railroads and the water lines are taken into account.

Fifth. That the theory that net earnings can be improved by taking on traffic at so-called out-of-pocket costs is full of fallacies and dangers, because such costs are a highly uncertain and fluctuating quantity. They are only low when no employment is required, but the proponents of this bill claim that the traffic which it will add will increase railroad employment greatly.

Sixth. That relief from the fourth section creates no new traffic but merely diverts traffic which is already moving from one railroad or one part of the country to another. It cannot affect the prosperity of the country as a whole. The claim that failure to grant liberal relief has prostrated manufacturing in the interior of the country at the expense of the seaboard is not supported by the census figures. On the contrary, they show the reverse.

Seventh. That fourth-section provisions were omitted from the Motor Carrier Act and the proposed water-carrier bill because it was felt that there was no need for such provisions in the case of those forms of transportation. If need is shown, they should be included. It still does not appear that there is any need in the case of the water carriers. There may be need in the case of the motor carriers, but the situation with respect to their rates is still very confused, and it is not yet possible to state with certainty that such need exists.

Eighth. That the present fourth section should be changed by the elimination of the so-called equidistant clause, which is an unnecessary nuisance, but should not otherwise be changed, with the possible addition of a time limit such as applies in suspension cases.

The Pacific Coast Differential

By John Nicolson

Formerly Special Counsel of the United States Shipping Board

The Pacific Coast Differential

This article is Chapter II of a new book on "The Maritime Subsidies Under the Merchant Marine Act, 1936," written by John Nicolson and about to be published by The Recorder Printing and Publishing Company, New York. Any inquiries concerning this book should be addressed to the author, in care of Pacific Marine Review, 500 Sansome Street, San Francisco.

John Nicolson, in his former connection with the U.S. Shipping Board, for several years had active charge of administering construction bounty, operating subsidy, and construction loans under the Merchant Marine Act of 1920.

Our maintenance on the Pacific Ocean of naval and merchant fleets adequate to our national defense and commercial interest, wholly independent of, and therefore largely in duplication of, similar resources on the Atlantic; and the maintenance on the Pacific Coast of shipyards, drydocks, etc., essential to their construction and repair, wholly independent of their having access to the Atlantic Coast, is a wise National policy, discounting the serious consequences which would result, especially in time of war, from a major disaster to the Panama Canal; and, incidentally, promoting the industrial welfare of the west.

The Pacific Coast differential is promotive of that policy, and is on a sound basis, if it does not result in discrimination between ports, or between citizens because of a difference of location of their residences in the United States, for in either such event it would be the introduction of a policy fundamentally new in our American system, a decision on the constitutionality of which would be awaited with interest.

When applied to vessels intended for foreign trade, as under Sec. 502 (d), the added cost resulting from it may be covered by an increase of the construction—subsidy. When applied to vessels intended for domestic trade, as under Sec. 509, the differential conceded takes the form of an interest rate on the construction "loan" lower than for a vessel built on the Atlantic Coast. Other sections of the Act will be considered as possibly also coming within the provision, by implication.

● **The Qualifying Factors Involved.**

The differential applies only when these facts also exist:

As to the **"Applicant"**: The status of the "applicant" as prescribed both in Sec. 502 and Sec. 509, must be as follows: The phraseology is substantially the same in both sections:

Sec. 502 (d).—"In case a construction subsidy is 'applied for under this title by an applicant who has as his principal place of business a place on the Pacific Coast of the United States. . . .' "

Sec. 509—"Provided, That in case a vessel is to 'be constructed under this section for an applicant who has as his principal place of business a place on the Pacific Coast of the United States.' "

(1). It will be noted that the above quotations refer to the "applicant"—not to the shipyard. That the word "applicant" does not refer to the shipyard is confirmed by Sec. 501 (a), where it is clearly revealed that the applicant is the person " . . . who is to operate and maintain the proposed new vessel . . . " It is also confirmed by Sec. 502 (a), for it is only after the Commission approves the application that the shipyard has an opportunity to appear.

(2).—As the specified restrictions relate only to the **applicant**, and as the shipyard is not the applicant, an Atlantic Coast Shipbuilding Company is free to build and maintain a yard on the Pacific Coast; nor would the fact that it had existed "prior to August 1st, 1935," prejudice its right to hereafter establish a yard there. The pronouns in the parenthetical clause refer to "applicant"—not to the shipyard.

Home Port of the Vessel: The Government's participation and aid is contingent in such cases also on the owner designating and maintaining as the home port of the vessel, a port on the Pacific Coast. The provisions to that end are as follows:

Sec. 502 (d).—" . . . and in such case no payment shall be made to aid in such construction or reconditioning unless the applicant accepts the bid of such Pacific Coast shipbuilder and agrees to designate and continue as the home port of the vessel to be constructed or reconditioned a port on the Pacific Coast."

Sec. 509.—" . . . such vessel shall be constructed for the applicant by the Commission only if the applicant accepts such lowest responsible bid of the Pacific Coast shipyard, and agrees to designate and continue as the home port of the vessel to be constructed a port on the Pacific Coast of the United States."

The shipbuilding company has nothing to do with this aspect of the matter; it is an obligation of the Commission as the initial owner of the vessel. If the requirement is to bind subsequent owners, the subsequent documents must of course be in form and of record to that end.

Operations Not Controlled by Home Port: The requirement indicates that Congress assumed having the home port on the Pacific Coast constitutes a guaranty that such port would necessarily be the base of

the vessel's operations, physically; but it does not. This implication is drawn from the fact that operation on the limited route is not prescribed, expressly, as the condition precedent, but only that the "home port" shall be on the Pacific Coast.

The location of the home port of a vessel does not control the field of its operations, either as a terminus, a port of call or otherwise; hence, so far as this specific requirement is involved, the agreement concerning the home port might be entered into and kept, without the objective being attained. Perhaps other provisions of the section are more effective.

Limitations on Vessel's Operations: Section 502 (d) relates to vessels which are given a construction subsidy—and only to such of these as are:

Sec. 502 (d).—" . . . to be operated in foreign trade in a service, route, or line from ports on 'the Pacific Coast of the United States.' "

With respect to those vessels intended for domestic trade, and therefore not qualified to receive a subsidy, the differential applies only to such of them as are:

Sec. 509.—" . . . to be operated in a coastwise, intercoastal, or other domestic service, route or line from or on the Pacific Coast of the United States."

● Extent and Nature of the Differential.

Although all other factors concur in a particular case, nevertheless the differential would not apply to the transaction if the Pacific Coast bid exceeds the prevailing Atlantic Coast bid by more than six per cent. The provisions of the two sections, respectively, are as follows:

Sec. 502 (d).—" . . . and the amount of the bid of the shipbuilder on the Pacific Coast who is the lowest responsible bidder on such coast for such construction or reconditioning does not exceed the amount of the bid of the shipbuilder on the Atlantic Coast of the United States who is the lowest responsible bidder therefor by more than 6 per centum of the amount of the bid of such Atlantic Coast shipbuilder, the Commission shall, except as provided in subsection (e), approve such Pacific Coast bid. . . ."

Sec. 509.—" . . . and the amount of the lowest responsible bid of shipyards on such coast for the construction of such vessel does not exceed the amount of the lowest responsible bid therefor of shipyards on the Atlantic Coast of the United States by more than 6 per centum of the amount of the bid of such Atlantic Coast shipyard. . . ."

It is clear that the preferential award cannot be claimed under a general offer by a Pacific Coast yard to build the vessel for an amount six per cent higher than the prevailing Atlantic Coast bid. The test is the comparison of competitive bids received in regular course, submitted and opened in conformance with the requirements of the Act.

A Capital-Cost Contribution: Sec. 502 (d).—Under this section the differential is a part of the capital invested in the ship, precisely as the construction subsidy is a part of the capital investment—but not by the owner. That the differential is, and should be, a contribution by the Government, is emphasized under the title: "By whom differential is paid."

An Interest Rate Concession: Sec. 509.—As vessels built under this section are for domestic trade, they can receive no construction—subsidy; hence, the excess cost resulting from the Pacific Coast differential cannot be covered in the form of an increased subsidy, and is therefore borne by the applicant.

Possibly it is to offset the burden thus placed on him, he is given an interest-rate concession on the construction loan, as follows:

Sec. 509—" . . . The minimum rate of interest on deferred payments shall be three-fourths of 1 per centum lower than the minimum rate which would otherwise be applicable, with respect to the periods of construction of such vessel and its operation exclusively in coastwise, intercoastal, and other domestic trade."

But this concession is contingent not only on the owner of the vessel continuing as its home port, a port on the Pacific Coast, but also on its being operated only: " . . . in a coastwise, intercoastal, or other domestic service, route or line from or on the Pacific Coast of the United States"; and in conformance with that requirement it is provided:

Sec. 509.—" . . . Such lower interest rate shall not apply with respect to any period in which the applicant:—

" (1) Does not continue as its home port a port on the Pacific Coast of the United States;

" (2) Operates the vessel in coastwise or other domestic trade other than on the Pacific Coast;

" (3) Operates the vessel in intercoastal or foreign trade except to and from ports on the Pacific Coast; or

" (4) Having been in business before August 1, 1935, and having changed his principal place of business to a place on the Pacific Coast after such date, maintains his principal place of business at any place on the Pacific Coast."

By Whom the Differential Is In Fact Paid: Just as the national defense features required by the Navy Department in vessels built by the Commission for private account are paid directly, by the Government, so the Pacific Coast differential, as a National defense policy, should be paid by the Government. And it is, directly and at once, when the vessel is for foreign trade—by an increase of the construction subsidy; indirectly and ultimately, when the vessel is for domestic trade—by the interest rate concession.

Illustration For a Subsidized Vessel: Let us assume an acceptable Atlantic Coast bid to be $3,000,000. Then a Pacific Coast yard may be paid $3,180,000. Now the test for the subsidy is the difference between foreign cost and domestic cost. If the Atlantic bid is used, the difference between it and the still lower foreign cost would be less than the difference between the foreign cost and the higher Pacific bid, hence the increase is thus automatically covered by the construction subsidy, and the applicant's investment in the vessel is the same in either event; nor would it have any bearing upon subsequent operating costs. It would, of course, be prejudicial to the Atlantic Coast yard.

Consequences of the Interest Differential: Sec. 509.—But the interest differential is very different in its operation and effect. Let us assume two competing vessels in the intercoastal service, identical in type,

size, and speed, built concurrently—one on the Atlantic Coast, the other on the Pacific Coast, at the costs, respectively, used in the illustration next above.

Assume also that both vessels are purchased under sales agreements with payments of 75 per cent deferred for 20 years, repayable in equal annual installments. The differential of three-fourths of one per cent in favor of the Pacific Coast vessel represents a saving to the owner of $168,750, and that saving functions as an operating differential to the prejudice of the Atlantic built vessels, distributed through the twenty years of the "loan."

Although this interest concession may be intended to amortize the excess cost the owner himself has had to pay—(because the vessel is for domestic use)—whether it does so depends on the percentage the excess—cost bears to the Atlantic Coast bid. If it is the maximum 6 per cent allowed by the law, the interest saving will not nearly cover the initial excess cost; and that is true if the excess is as low as 4½ per cent of the Atlantic Coast bid.

On the other hand, if the excess cost is 4 per cent, or less, of the Atlantic Coast bid, a substantial profit accrues to the operating owner by reason of this provision of law—and the lower that percentage, the higher will be that profit, for the interest concession operates in full, and for the full amount of the loan, no matter how slight the excess cost may be.

To illustrate: If the owner paid an excess construction cost of, say, $8,000 on a $3,000,000 vessel, and had a construction "loan" of 75 per cent for 20 years, etc., then this small excess payment, made once for all, would produce a dividend exceeding 100 per cent annually, for twenty years — for the total saving to him, resulting from the three-fourths of one per cent interest concession, will exceed $160,000!

In such cases, therefore, the self-interest of the owner supplements the mandate of the law, in having the differential applied. But, conversely, whenever the excess over the Atlantic Coast bid is 4½ per cent, or more, then the owner's self-interest will be adverse to its application.

As the Government will pay the full amount of the differential in all cases when the vessel is for foreign trade, should it not do so, in all cases, also when it is for domestic trade? The fact that the latter is a protected trade is not relevant. The objective of the differential is not to equalize competitive conditions in the operation of vessels; it is to equalize the Pacific Coast yards in their competition with Atlantic Coast yards.

● Is the Grant of the Differential Mandatory?

When the qualifying factors exist, the following provisions then apply, respectively:

Sec. 502 (d).—" . . . the Commission shall . . . approve such Pacific Coast bid, and in such case no payment shall be made to aid in such construction or reconditioning, unless the applicant accepts the bid of the Pacific Coast shipbuilder . . ."

Sec. 509.—" . . . such vessel shall be constructed for the applicant by the Commission only if the applicant accepts such lowest responsible bid of the Pacific Coast shipyard .. . ."

Hence, whether for foreign trade or for domestic trade, the grant of the main assistance sought is contingent on the applicant "accepting" the Pacific Coast bid; he is without discretion in the matter—other than the right to withdraw his application altogether.

Is the Commission also without discretion? The use of the word "shall" in the Act, does not control; it is frequently interpreted "may." Whether a discretion exists will be determined, not solely by the exact language of the clause, but by such language interpreted in the light of the provisions and purposes of the entire Act. Under that broad test it may possibly be held that the Commission can, in its discretion, and as the cases severally arise, determine whether the differential should be applied.

In the quotation from Sec. 502 (d), above, the blank space indicates the omission of the following words:— . . . " . . . except as provided in sub. sec. (e) . . . ." That subsection authorizes the Commission to ignore all bids, under certain circumstances, and have the work done in a navy yard.

The Parenthetical Clause: A parenthetical clause qualifying the "applicant" subject to the differential, occurs in Section 502 (d) and 509, in identical words, as follows:

Sec. 502 (d).—" . . . (but not including one who having been in business on or before August 1, 1935, has changed his principal place of business to a place on the Pacific Coast of the United States after such date)."

Whatever the significance and consequences of this provision may be, its consideration is not germane here, for its does not refer to the shipyard; the pronoun "his" relates to "applicant."

However, if the consequences of this clause and its context is that a citizen of the United States resident on the Pacific Coast is subject to a handicap or is entitled to a privilege to which a citizen resident elsewhere in the United States is not subject or entitled, neither the justification of the provision nor its constitutionality is apparent.

Reconditioning of Vessels: It will be noted that the differential applies also to reconditioning vessels for foreign trade (Sec. 502 [d]). But not to reconditioning vessels for domestic trade. (Sec. 509). This coordinates with the fact that construction subsidies under Sec. 502 apply not only to new vessels in foreign trade, but to reconditioning old vessels in that trade; but under Sec. 509 construction subsidies are not available for any vessels whatever—new or old—because they are intended for domestic trade.

Does the Differential Apply To Sec. 504? This section covers the case of an "applicant" who intends financing the vessel himself, but wants the benefit of a construction subsidy; it contains no reference to the differential; but authorizes the subsidy: " . . . in an amount determined by the Commission in accordance with Sec. 502 of this Title." It will be noted the reference is to "Sec. 502"—and therefore covers all of its subsections. By sub. sec. (d) the Pacific Coast differential is made a factor in the computation. Furthermore, the reasons for applying it under Sec. 502 apply with equal force to vessels built under Sec. 504—

(Page 29, please)

American Shipbuilders Versus Nye, Clark, Pope and Bone

A Senate Committee Majority Recommends Government Ownership of Facilities Adequate for Construction of all Warships

Emphatic and challenging opposition to the majority program of the Nye Munitions Committee for a government monopoly of naval shipbuilding was filed with members of Congress and the Secretary of the Navy recently by the National Council of American Shipbuilders, which represents the larger part of the shipbuilding and ship repair industry of the United States.

The shipbuilding industry analyzes the Nye Committee recommendations as altogether capricious and ineffectual as the peace measure for which they were advanced, but as tending on the other hand to create an actual war hazard. In addition, according to the report, the program contemplated by the recommendations is highly inimical to the national defense and the general efficiency of the United States Navy.

Coming at a time when the Navy is preparing for the construction of the first two battleships since the Washington Limitation of Armaments conference of 1922, and when the question of naval construction has been pressed to the forefront by the rearmament programs of Great Britain and other nations, the report warns against the extension of government owned shipbuilding facilities in this country because of the local political pressure which would be continually exerted to keep these government owned yards in full scale operation, thereby speeding rather than retarding the rearmament race.

The report sharply attacks the committee's majority procedure in making the industry a political football and converting the committee hearings into a rostrum for the advocacy of government ownership, rather than devoting them to fact finding about shipbuilding costs and practices. It points out that the case against American shipbuilding obviously was prejudged, and shows that during the process of the inquiry the industry, as represented by the National Council of American Shipbuilders, was denied repeated requests for opportunity to testify in order to clear numerous matters which without such testimony became garbled and confused.

● Conclusions Unsound

Disputing the soundness and accuracy of the Nye majority conclusions, the report points to a number of salient facts, which may be summarized as follows:

1. By awarding naval contracts to commercial shipyards, the United States Government maintains an essential industry at no additional cost to itself, but rather at a saving, and preserves the organizations of skilled and experienced executives, engineers, draftsmen and workmen which are necessary to form the nucleus for the rapid expansion of the industry in an emergency.

2. The Nye program is unsound economically because

U. S. airplane carrier Saratoga. This vessel and her twin, Lexington, are the two largest craft in the United States Navy. Powered with turbo-electric machinery generating 180,000 horsepower, they are capable of 35 knots speed. Saratoga was built by New York Shipbuilding Company, at Camden, Lexington at the Fore River Plant of Bethlehem Shipbuilding Corporation, Ltd.

The U. S. airplane carrier Enterprise, under construction and ready for launching at the yard of Newport News Shipbuilding and Drydock Co., Newport News, Va.

it would mean the unnecessary duplication of existing facilities at public expense and an inevitable higher expenditure for future naval vessels. In a detailed study of costs, the report shows that naval vessels cost the taxpayer substantially less when built in commercial shipyards than in government owned yards. Emphasis is given to the garbled and misleading cost figures presented to the public by the Nye committee, purporting to show a saving on government built ships. Under the system of government accounting, the returned costs of navy yard built ships do not include the complete cost incurred by the taxpayer, yet the record taken as a whole shows conclusively that the entire cost to the government of the ships produced by commercial builders has been less than the nominal cost of the ships built in navy yards. The erroneous finding of the committee majority to the contrary is obviously based on incomplete information relating to only a few cruisers constructed under abnormal conditions.

3. Commercial shipbuilders have not made large profits, the average for those companies engaged in naval construction being less than 5½ per cent. This average is taken on both merchant and naval construction over a period of many years, including the World War years of stimulated building.

4. Severance of the natural affiliation between naval and merchant ship construction, as proposed by the Nye plan, would weaken the effectiveness of the United States Navy and deprive it of the valuable research and construction experience of the commercial industry, which has been responsible in large measure for the high efficiency and progressive development of both naval and merchant ships.

5. Shipbuilding is a distinctive industry which cannot be confused with guns and ammunition merely because it was arbitrarily grouped with them in a committee investigation. The ordnance and armaments for naval vessels are supplied to shipbuilders and largely manufactured by the government itself, leaving to the shipbuilding industry the production of the actual naval vessel, which is much more closely related to commercial shipbuilding than to the manufacture of the arms and implements of warfare. The Nye program to place all munitions manufacture under a government monopoly cannot pertinently apply to shipbuilding.

6. Instead of making war less likely, as its proponents assert, the majority proposal would stimulate competitive naval building under the lash of political necessity. Constant pressure would be exerted to keep the government owned yards in full scale operation and employment at the highest level. Under the political control of shipbuilding the United States inevitably would become a dominant factor in the rearmament race.

7. The shipbuilding industry categorically denies the insinuations and innuendos of the committee majority that it has been a war incitant. The National Council of American Shipbuilders points out that it has never advocated the building of a single naval vessel. Neither can a responsible and vital industry be besmirched by citing errors of judgment or alleged misdeeds of a few individuals. Specific charges of wrongdoing against the industry collapsed when subjected to examination.

● Blanket Indictments Unfair

The report stresses the fact that the committee made no investigation of past wars to determine whether the causes of war have been deep-seated, but merely postulated that war was dominated by munitions manufacturing. It quotes from an article by the wartime Secretary of War, Newton D. Baker, stating that munition makers had no relation to the decision in 1917. The report then adds the following comment:

"It seems quite apparent that it is unfair and unwise for anyone, whether an individual or a committee majority, to marshal all of the nation's defense factors under one banner and then make that banner a symbol of rapacity. No unbiased public servant seeking a judicial examination of the issues would countenance such a program.

"Blanket indictments have always been open to the suspicion that some undisclosed purpose is being served. Many have insisted that the Nye investigation was an effort to use selected industries as tools to advance a political concept, namely, government ownership, with shipbuilding as the entering wedge. Others have

considered the entire inquiry waste motion."

Dealing with the innuendos which dominated the hearings that the shipbuilding industry wanted to promote war, the report analyzes the industry's history, responsibility and the conditions which would confront it in an emergency.

"Even if one should acknowledge the insinuation that the American shipbuilding industry wants to promote war as a measure of self interest," said the report, "the committee majority's program to strip it of naval building would not be pertinent to the question. Merchant shipbuilding, which has always been a commercial industry, is the phase of shipyard work that would be encouraged. So would clothing manufacture, lumbering, automobiles, steel and countless other manufactures, and none can say with justice that either those industries or shipbuilding are actuated to such a miserable degree by the profit motive that they would want to foment war in order to increase production. The charge is a grave one to be made lightly.

"Even as a matter of profits, responsible industry has learned that accelerated war-time manufacture is outbalanced by the period of industrial stagnation and depression which inevitably follows war. In the end war benefits nobody, not even the balance sheet."

● Nye Program No Peace Measure

As to the peace aspects of the Nye program, the report regards the claim that it is a peace measure as altogether unfounded:

"It is plain that the government navy yard, subject to political influence, would be under continual community and sectional pressure to keep operations and employment going at full scale. Construction programs of one kind or another would have to be fed into the public yards. When the navy yard builds up employment to a given situation, heavy political pressure is always present to supply the yard with enough work to keep employment at that level. Lay-offs are difficult, and the net result is a tendency for employment to continually increase. Any new spurt of work means payroll additions which political pressure is interested in keeping permanent. It means larger local payrolls, satisfied voters. The local community is scarcely subject to censure for wanting full scale employment retained.

"The commercial yard is much less subject to political influence because everyone knows it cannot secure new work on account of community necessity. The only way to obtain it is by competitive bidding. It is not difficult to discern what situation would be most likely to spur naval building, which is the thing the committee majority presumably seeks to avert."

● Shipbuilding Profits Low

The report goes into a lengthy examination not only of shipbuilding profits, but also of relative costs of building naval vessels in commercial and government owned shipyards. It points out that the cry of profiteering raised against the industry collapses upon investigation, which discloses that profits taken over a period of many years on both merchant and naval work, including stimulated World War construction, show an average for the companies engaged in naval work of less than 5½ per cent. The report lists the companies whose earnings are taken into this average. The figures do not indicate the heavy losses since the war by Cramps, whose shipyard has been closed.

"Taking into consideration the subsidies enjoyed by the government yard," the report asserts, "it is doubtful if an instance can be shown where a ship built in a government yard cost less than the same type ship built in a commercial yard. Commercial yards have incurred heavy losses on many vessels. Any accurate review of the industry would balance those losses against profits on other ships, yet that was avoided by the committee. As has been pointed out, profits have averaged less than 5½ per cent over a period of many years. Nobody—committee, group or individual—can make a story of profiteering out of that."

● Profit Limitation on Naval Work

Moreover, the report recalls that Congress prior to the Nye investigation had provided in the Vinson-Trammell Act a profit limitation of 10 per cent on naval contracts, without in any manner guaranteeing a profit or protection against loss, which, taken with the spirited bidding of an industry operating much below capacity, means an unusually drastic profit limitation, as it undoubtedly will curtail average earnings to lower than the past figure of less than 5½ per cent, if not actually eliminate profits or result in a general loss.

Leaving out of consideration many factors which in the government navy yards have been chargeable in the past against other appropriations but which in the commercial yard are part of the actual cost of the ship, the report shows that in the building of the Louisiana, Utah and Texas by commercial yards, and the three respective sisterships, the Connecticut, Florida, and New York by the navy yards, the cost in the government navy yards, according to Paymaster General's reports, was 20.6 per cent greater than in commercial yards. Similarly, submarine costs are shown in a comparison between similar type craft to be 22 per cent less in the commercial yard.

The report devotes much attention to the relationship between naval and commercial ship construction, pointing to the designing and construction talent available to the Navy in the commercial industry and to the study, research and attentiveness of commercial builders to developments in merchant ship construction in other nations:

● Development and Research

"While the United States Navy is to be commended for its own extraordinary developmental work with American naval vessels and for the research facilities which it maintains, many of the greatest and most revolutionary advances in American shipbuilding have come from the commercial shipyards. Both turbine and electrically driven vessels are largely the results of commercial investigation and initiative. The current work with diesels is being carried on largely under private auspices. Welding first replaced riveting in commercial industry.

"An illustration of the recent rapid development of shipbuilding efficiency may be seen in the fact that the present-day ship gets as much as 40 per cent more horsepower than was possible on the same amount of

fuel before the World War. Commercial industry has contributed marked advances in propeller design and higher steam pressures. . . .

"Shipbuilding progress is by no means exhausted. Numerous recent improvements point to still greater change. To be efficient, every naval vessel must embody the latest of practical developments. An obsolete warship is as worthless as a national defense factor as an obsolete automobile is on a speedway."

Attention is drawn to the complementary nature of merchant and naval shipbuilding. A corresponding advantage redounds to the merchant marine from the experience gained by commercial shipbuilders from their naval work. This is important because merchant vessels have an imperative use as auxiliaries in an emergency.

● British Practice

Explaining that the Munitions Committee investigation may have served some good purpose in focusing attention on shipbuilding and munitions manufacture, the report refers to the exhaustive fact finding investigation made contemporaneously in England by a Royal Commission, which confirmed the British practice of awarding naval contracts to commercial companies and showed how this practice benefited the British Navy in the emergency of the World War. The National Council of American Shipbuilders requests a most careful study of the Nye proposal because of its vital bearing on the national defense, peace and the nation's economic welfare.

"It cannot be emphasized too strongly," says the report, "that the commercial shipbuilding industry has survived during the period since the World War because a portion of the new construction work of the United States Navy has been available to it. The relationship has been fair to all concerned. An essential industry has been upheld. The war hazard has not been increased—possibly diminished—and no valid charges have been made that the shipbuilding industry has made one effort to increase it. Either a full or a cursory investigation of this situation should carry conviction that the relationship between the Navy Department and commercial shipbuilding is one which should be encouraged rather than condemned."

Pacific Coast Differential

(Continued from Page 25)

which relates also only to vessels for foreign trade. The fact that a construction loan is not sought has no bearing on the question. The interest rate concession does not apply to vessels having a construction subsidy, and therefore neither to Sec. 502 or Sec. 504.

Does the Differential Apply to Sec. 702? This section relates to construction by the Commission solely for the Government's account. Although it does not contain an express reference to the differential, Sec. 703 (b) implants in it, by general reference, all the requirements of Title V germane to it, and therefore those prescribed by Sec. 502 (d), referred to above. It would seem, therefore, construction under Sec. 702 is subject to the differential.

Does the Differential Apply to Sec. 714? This section also relates to construction for Government account, in contemplation of an immediate charter for its use on a particular trade route. It does not contain any reference to the differential; but it seems also to come within the provisions of Sec. 703 (b), referred to next above, and therefore subject also to the 6 per cent preferential in favor of Pacific Coast yards.

● Resume of the Cost-Absorption:

We have thus seen that the extra cost resulting from this differential is directly absorbed by the Government when incident to subsidized construction; and is indirectly absorbed by it, in whole or in part, when incident to construction for domestic trade. Also that it is a negligible factor with sales of vessels under Sec. 704, as they may be sold at any price the Commission elects. With respect to construction under Sec. 714, however, it is necessarily "passed on" to the charterer to the extent of annual interest on the excess cost, by the provision of Sec. 714 requiring the charter-payment to be not less than 5 per cent on the construction cost of the vessel—to the Commission. If the charterer purchases the vessel under an option he is given the benefit of the construction subsidy, and the excess is then absorbed by the Government. Furthermore, if a charterer under Sec. 714 is also given an operating subsidy, under Sec. 708, the interest on the excess cost arising from the differential would be automatically absorbed in that subsidy.

An Efficient Pressure-Vacuum Relief Valve

An item of tanker equipment which has gained much well merited popularity among the operators of oil tank vessels is the Vac-Rel weight loaded pressure-vacuum relief valve.

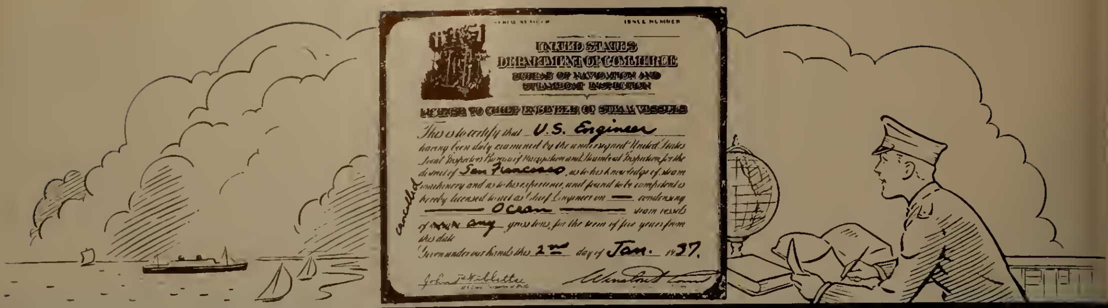
These valves have proved themselves to be efficient, durable, and, what is most important, reliable. All parts can easily be removed for examination and cleaning and can be replaced without adjustment of any kind. The valves are well guided and will function perfectly on a rolling ship.

They are made in two general styles, the Atmospheric pattern, which connects directly with the atmosphere through a double flame screen, and the Enclosed pattern, for use in connection with a closed vent system.

Made for opening pressures from 0.5 lb. per square inch up to 3.0 lbs., they are available in sizes and types suitable for almost any kind of marine tanker service.

The valves have the official approval of the Bureau of Marine Inspection and Navigation, U.S. Department of Commerce, the American Bureau of Shipping, and Lloyd's Register, as well as the safety committees of many of the large oil companies.

That their merit is well-deserved is attested to by the fact that there are now over 1750 Vac-Rel valves giving satisfactory service on more than 125 oil tankers.



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

To Marine Engineers:

This is YOUR page. We want you to write in your problems. Ask your questions. Tell us what you think of this page. Help us to shape this section to more accurately fit your needs.

There were three errors in the February issue. We offer a year's subscription free as a prize to readers who find these and give us the correct statements. Send your letter to: The Chief, care Pacific Marine Review, 500 Sansome Street, San Francisco. This offer good until 12 noon, June 15, 1937.

The Chief.

Courtesy of "The Ship's Bulletin", Marine Department, Standard Oil Company of New York.

Factors Determining Horsepower Output

There are eight principal factors which determine the H. P. output of steam turbines. They include the energy available, the methods used, and losses incurred in utilizing the energy. The first two items determine the available energy. The remainder determine how effectively it is used and the turbine efficiency, which will vary from 45 to 60 per cent on small units up to 75 per cent approximately on well designed marine installations and to perhaps 80 per cent on the best stationary installations. These eight items are:

(1) The heat drop in B.T.U. per pound of steam, or H_1-H_2, where H_1 is heat content per pound in steam at steam chest and H_2 is heat content per pound in the exhaust. Wet steam at admission reduces H_1. Raising steam pressure and temperature increases H_1, and getting a better vacuum lowers H_2, thereby increasing the difference and the heat drop.

(2) The rate of steam flow passing through the turbine in pounds per hour. (Except for item 8, mechanical friction, the energy from the following losses returns to heat in the steam, and that not recovered in lower stages increases H_2. Losses in the last stage are not recovered at all.)

(3) The velocity ratio is the ratio of jet velocity V to bucket or vane velocity U. Theoretical values were developed in the last article, as $U = \frac{V}{2}$ for impulse and $U = V$ for reaction. Actual values will show U as less

than theoretical values by 10 per cent to 25 per cent or perhaps more, depending on the compromise in design to keep the r.p.m. down to the desired value and at the same time not to have too many stages, as increasing the number of stages decreases the jet velocity V. This loss is the kinetic energy in the steam after it leaves the moving buckets or vanes, and good design keeps the leaving velocity as low as possible. This factor is called the **leaving loss.** It is closely connected to the bucket efficiency, item four, particularly as to angle of entrance and exit. (Items 3 and 4 together form by far the largest loss in steam turbine operation.)

(4) Nozzle and bucket losses are principally the following:

Angle of entrance and exit necessary to clear the jet from buckets gives rise to a velocity in an axial direction towards the low pressure end of turbine, which cannot be made useful in turning the wheels, hence is a very important loss. It also is a leaving loss.

The actual shape of nozzle in section at right angles to steam path makes but very slight difference. The principles of stream line flow apply, however, and rounded entrances are provided. Everything is done to prevent eddies in stream flow and to allow a smooth, unbroken path. Eddies and impact in the stream line flow cause friction of the steam, and are a loss.

Friction on the metallic surfaces is a loss. Polished surfaces on buckets and nozzles will give a surprising reduction in loss, but are somewhat impractical.

Moisture in the steam gives rise to a frictional loss. Designs are usually made to throw off as much as is practicable of the moisture as it condenses in the steam in the lower pressure stages. Loss from moisture friction is a very important part of the total loss.

(5) Leakage and packing losses are important considerations. Shaft packing looses some steam either from a higher to lower pressure or to condenser. Packing between stages passes some steam, which, therefore, does not do work on the wheels. Leakage past the tips of stationary and moving nozzles in the reaction turbine is a loss to be designed against, and requires close mechanical clearances between stationary and moving parts to reduce it.

(6) Radiation losses result in clooling the steam, condensing it in all parts of the turbine. Proper lagging or heat insulation can reduce these losses to an almost inconsequential part of total loss. They include all radiation cooling and condensation due to loss of heat as heat from the entire unit.

(7) Windage friction loss is the loss due to the mechanical energy required to turn the wheels and buckets in the steam atmosphere. The steam has some dragging effect on the surface of the wheels or drums spinning at such high speeds. But more serious is the loss due to the velocity of buckets or vanes in the relatively stationary steam atmosphere. This occurs where, in the complete circle of buckets on a wheel, some do not have a jet of steam on them. Usually the first stage does not have nozzles all around the circle, hence buckets in passing through this zone do not have a jet playing on them, hence drag the atmosphere, with resulting friction. This loss does not occur in the zones where jets play on the buckets. With a geared turbine running nearly full speed with steam cut off, being dragged along by the propeller, the buckets will soon heat up, possibly to a dangerous temperature, even though the pressure in all stages is reduced to the vacuum. Some steam must always be allowed to pass through a turbine when it is running to keep the blading cool.

(8) Mechanical friction, with a steam turbine, is of almost minor consideration. It can occur only at the bearings, and is a very small item.

● Design of a Steam Turbine

The foregoing considerations indicate that a designer will have a pretty close estimate of the total amount of steam to be passed through the turbine per hour or per second. The H.P., steam conditions, and a reasonable estimate of the efficiency give him this. He can increase efficiency by increasing the number of stages, but cost, space, or weight limitations and other factors limit this to a definite number, which he finally decides upon.

He next determines the area of the nozzles, in square inches, required to pass the necessary steam, taking each stage separately, knowing the pressure at admission and discharge for each stage from the heat drop assigned to it. He usually takes the admission pressure of a stage as being the exhaust pressure from the stage just ahead of it.

From much experimental data and experience, designers compute the required area from one of two formulae, depending upon whether the flow is smooth or broken, which in turn depends upon whether the discharge pressure is more or less than about 57 per cent of the absolute admission pressure. The smooth flow jet issues from the nozzle as a solid stream, does not break up or expand to any great extent until it has passed away from the nozzle some distance. If its velocity is not removed in a moving bucket, it will eventually break up from friction on the atmosphere into which it discharges. The broken flow jet breaks up just as soon as it leaves the nozzle. It hisses and sprays, breaking up at once into side jets. Expansion of the steam apparently takes place **after** it has left the throat or smallest area section of the nozzle. Small turbines make use of the expanding throat nozzle under these conditions, and continue the nozzle with increasing area for some distance after the throat, to re-direct the side jets. If this is not done, the moving buckets and reversing stationary buckets are given increased length and area of passage, and shrouded to properly direct the jet.

● Smooth Flow

Smooth flow is the more desirable, and occasions the lowest losses. It is generally used in the reaction blading and all but the first stage of the impulse turbines.

When the absolute discharge pressure is more than about 57 per cent of the entrance pressure, the area may be found from the formula $A = \frac{144 \times F \times B}{C \times V}$, where A is the area of nozzle at throat in square inches, F is the weight of steam in pounds, necessary to pass

each second; B is the volume of the steam at the exhaust side of nozzle in cubic feet per pound; C is the efficiency factor, and may be taken at .95 for ordinary cases; V is the theoretical jet velocity, and is $223.7 \sqrt{H_1 - H_2}$. See previous articles.

Note that this takes into consideration both the admission and exhaust pressure and heat content.

Broken Flow

Broken flow occurs when the absolute exhaust pressure is less than 57 per cent of the absolute admission pressure. The area of the throat of the nozzle may be computed from the formula $A = \frac{60 \times F \times S}{P^{.97} \times C}$, where A is area of throat of nozzle in square inches; F is flow of steam in pounds per second; P is absolute pressure at admission in pounds per square inch.

In this formula P is raised to the .97th power, which reduces the value slightly. For rough calculations this may be neglected and P used without the decimal exponent.

S is a factor to correct for moisture or superheat in admission steam, as follows: $S = 1 + .00065d$, where d is degrees F superheat, or $S = \sqrt{X}$, where X is the quality of the steam expressed as a decimal, such as, 6 per cent moisture is .94 quality. C is an efficiency constant, and for our use may be taken as .95.

Note that for a given area and admission pressure the flow is independent of the exhaust pressure. This may be high or low, as long as it is less than 57 per cent of admission pressure its value will not change the flow materially. Thus a 40 pound gage pressure steam jet, discharging through a nozzle or orifice into the atmosphere, would not pass any more steam if it were discharging into a vacuum.

In general this also means that our marine condensing turbines, with valves open, will pass about as much steam into atmospheric pressure or a low vacuum as they do into the regular high vacuum. Furthermore, our reversing turbines, being only two or three stage, perhaps only one stage, if designed to pass the same amount of steam as the ahead units, will have the same area of nozzles as the ahead turbines. On account of the much lower efficiency of use of steam, however, they may have more area, pass more steam, and produce less horsepower.

The Buckets and Wheels

The speed in r. p. m., velocities and mean diameter of bucket or vane rows have already been discussed. The area of the nozzles is calculated, which then determines the length of the buckets or vanes in each stage. Increasing volume at decreasing pressure causes a rapid lengthening of buckets as we approach the condensing end. Buckets at last stage on large units sometimes become the limiting feature of design on account of length. Buckets have been used as long as about three feet. Marine units seldom use buckets longer than 14 to 18 inches.

Good design of the longer buckets gives a twist to the shape from its bottom to its top or tip. The nozzle supplying steam to buckets spouts steam at the same velocity at the top or outer portion and at the bottom or inner part nearest the shaft. But the bucket velocity is highest at the tip farthest from shaft. Hence the angle of entrance and exit of the bucket will be slightly different, which accounts for the twist in bucket shape. Buckets less than about six inches long usually are not twisted.

Methods of fastening buckets or vanes to the wheel or drum vary with different manufactures. Literature on the subject, text and handbooks are complete on these details, and the reader is encouraged to study these further.

By far the chief force on buckets is that from centrifugal force. At full speed, if they were flexible, the steam forces would not deflect them from a straight radial position.

Let us see what the steam force is on an impulse bucket. Assume one of the lower pressure stages of your turbine develops 1,000 H.P., is 4 feet mean diameter with 10 inch long bucket, running at 3,000 r. p. m., and there are 150 buckets on the wheel. The torque* developed is: $\text{torque} = \frac{5250 \times \text{H.P.}}{\text{r. p. m.}} = 1750$ lb. feet.

The equivalent force at the pitch diameter of four feet or radius of two feet would be one half this torque, or 875 lbs. This force, distributed over 150 buckets, would be 5.83 lbs. per bucket.

Centrifugal Forces

The centrifugal force is a force radial and from the center, due to rotation of any weight around a center. Numerically it is: $Fc = \frac{WV^2}{gR}$ where Fc is the centrifugal force in pounds, away from center; W is weight of object in lbs.; V is velocity of object in feet per second; g is gravitational constant, 32.2 feet per sec.^{2}; R is radius of rotation of weight W in feet.

If the bucket in our example were to weigh one pound, we would have: $V = \text{r.p.m.} \times \text{Diam.} \times 3.1416 = \frac{3000 \times 4 \times 3.1416}{60} = 628.3$ ft. per sec.

$$Fc = \frac{1 \times 628.3^2}{32.2 \times 2} = 6{,}130 \text{ lbs.}$$

Over 6000 times its own weight; a tremendous force.

Very skillful design is required to keep the stresses in the steel within a safe margin, even allowing but little factor of safety. We must design for a little over speed, with force increasing as the square of the speed. With top speed about twice normal, as developed in last article, force would be four times this value, almost impossible to design for. The low pressure wheels are almost sure to burst at runaway speed, hence the importance of over speed trip, operating to shut off steam at 10 per cent over speed. Adding more metal to buckets only increases the force almost as much as the strength is increased. Thus the speeds of turbines are limited by the strength of the metals.

*Torque is the measure of the turning or twisting effort, and is considered as the force in pounds at a distance or radius of one foot from the center of the shaft.

History of the AMERICAN-HAWAIIAN STEAMSHIP COMPANY by periods 1899 to 1936 inclusive

WILLIAMS STEAMSHIP CORPORATION and the OCEANIC & ORIENTAL NAVIGATION COMPANY

1855-1899	1900-1906	1907-1913	1914-1919	1920-1929		1929 Fleet
Sailing Ship Service Coast-to-Coast via Cape Horn	Steamer Service via The Straits of Magellan (Coast-to-Coast and Hawaii)	Fleet divided into Atlantic and Pacific units with transhipment service across Isthmus of Tehuantepec (Coast-to-Coast and Hawaii)	Coast-to-Coast via Panama Canal; Trans-Atlantic World War Service; Ships Chartered Out in other Trades	Coast-to-Coast via Panama Canal; 1920—14 day Sailings; 1921—10 day Sailings, 7 day Sailings	1925—5 day Sailings; 1927—4 day Sailings; 1929—3½ day Sailings	
York to San Francisco 90 to 120 days	New York to San Francisco 56 days	New York to San Francisco 26 days	New York to San Francisco 22 days	New York to San Francisco 21½ days		
[illegible] the outstanding per- of these California ... "Sovereign of the ... York to San Fran- 103 days, Honolulu to in 82 days, "Glory of New York to San in 96 days, the "Flying "Andrew Jackson," "Sword Fish," ... from New York to ... in 89 to 92 days ... many others, more ... all, equally famous ... were these ships, with ... bows, raking and ... masts with double ... sails and great ... They were designed ... for fast sailing ... there will ever be ... but it is doubtful ... any craft, past, present, ... be, will equal the ... attached to these California clippers. There was ro- ... their very names ... the Seas, "Lightning," ... "Blue Jacket," ... "Charmer," "Char- ... "Comet," "Flashing ... "Fearless," "High Flier," ... "Sea Devil," "St ... and others ... Clipper Sailing Ships ... tonnage 1000 to 1800 to	A†*Alaskan (1902); G†American (1900)	Alaskan; American	Alaskan; American; F†Arborean (1916—Sold 1916)	Alaskan (Sold 1926); American (Sold 1926)	D‡Alaskan (2nd) (1928); E‡American (2nd) (1925)	Alaskan (2nd); American (2nd)
	A†*Arizonan (1903)	Arizonan	Arizonan; F†Artisan (1916—Sold 1916)	Arizonan (Sold 1928)	D‡Arizonan (2nd) (1929)	Arizonan (2nd)
	G†Californian (1900)	Californian; B†*Columbian (1907); D†Dakotan (1912)	Californian (Sunk by Mine 1918); Columbian (Sunk by Sub 1916); Dakotan; D†Floridian (1915)	C‡*Californian (2nd) (1922); E‡Columbian (2nd) (1925); Dakotan; Floridian (Sunk 1928)		Californian (2nd); Columbian (2nd); Dakotan
	G†Hawaiian (1901)	H†Georgian (1910); Hawaiian; I†Honolulan (1910)	Georgian (Sold 1916); Hawaiian; Honolulan (Sold 1916)	E‡Georgian (2nd) (1920-Sold 1929); Hawaiian (Sold 1925)	D‡Georgian (3rd) (1929); E‡Hawaiian (2nd) (1925)	Georgian (3rd); Hawaiian (2nd)
			D†Iowan (1914)	Iowan		Iowan
		H†Isthmian (1908); C†*Kansan (1911); D†Kentuckian (1910); B†*Mexican (1907); D†Minnesotan (1912); I†*Missourian (1907); H†Montanan (1913)	Isthmian (Sold 1916); Kansan (Sunk by Mine 1917); Kentuckian; Mexican; Minnesotan; Missourian (Sunk by Sub. 1917); Montanan (Sunk by Tor 1918)	E‡Kansan (2nd) (1925); Kentuckian; Mexican; Minnesotan; C‡*Missourian (2nd) (1923); E‡Montanan (2nd) (1925)		Kansan (2nd); Kentuckian; Mexican; Minnesotan; Missourian (2nd); Montanan (2nd)
	M†*Nebraskan (1902); M†*Nevadan (1902)	Nebraskan; Nevadan	Nebraskan (Sold 1916); Nevadan (Sold 1916); D†Ohioan (1914)	K‡Nebraskan (2nd) (1920-Sold 1926); K‡Nevadan (2nd) (1920-Sold 1926); Ohioan	D‡Nebraskan (3rd) (1927); D‡Nevadan (3rd) (1927)	Nebraskan (3rd); Nevadan (3rd); Ohioan
	G†Oregonian (1901); K†*Texan (1902)	Oregonian; H†Panaman (1913); H†Pennsylvanian (1913); Texan; C†*Virginian (1907)	Oregonian; Panaman; Pennsylvanian; Texan; Virginian; D†Washingtonian (1914-Sunk 1914)	Oregonian (Sold 1926); Panaman; Pennsylvanian; Texan; Virginian	E‡Oregonian (2nd) (1925)	Oregonian (2nd); Panaman; Pennsylvanian; Texan; Virginian

D—10,250 DWT I—9,300 DWT I—9,000 DWT G—8,250 DWT H—8,000 DWT K—5,300 DWT M—5,250 DWT † Built on date shown ‡ Purchased on date shown * Twin Screw ‖ Motorship, others reciprocating

PRESIDENTS

1918 Nov. ... Armistice signed. Latter part of 1918 fleet redelivered to the Company.

1920 OHIOAN ... intercoastal service ...

American-Hawaiian S. S. Co. ... in connection with American Ship & Commerce Corp. formed United American Lines ...

PURCHASE RECORD

Alaskan (2nd)	Ex Wheaton
American (2nd)	" Santa Barbara
Arizonan (2nd)	" Willhilo
Columbian (2nd)	" Santa Clara
Georgian (2nd)	" Clarksburg
Georgian (3rd)	" Willsolo
Hawaiian (2nd)	" Santa Malta
Kansan (1st)	" Massachusetts
Kansan (2nd)	" Santa Olivia
Missourian	" Missouri
Montanan (2nd)	" Santa Paula
Nebraskan (2nd)	" Fairmont
Nebraskan (3rd)	" Kermit
Nevadan (2nd)	" Franklin
Nevadan (3rd)	" Montpelier
Oregonian (2nd)	" Santa Rosa
Virginian	" Maine

WORLD WAR CASUALTIES

CALIFORNIAN—Capt. Daniel Malman

Sunk by a mine 1918 near the Pera Le Lallice off the ... France.

COLUMBIAN—Capt. F. E. Curtis

Sunk by a submarine 1916 off the Spanish Coast and the Master taken prisoner on the submarine ... and Master ... ship ... on Spanish Coast.

KANSAN—Capt. E. A. Forsyth

Sunk by a mine 1917 off Belle Isle ... French Coast ... St. Nazaire.

MISSOURIAN—Capt. Wm. Lyons

Sunk by a submarine 1917 ... miles ... in the Mediterranean ... landed ... ship ... at Port ... Mau.

MONTANAN—Capt. Wm. Lyons

Sunk by a torpedo 1918 in ... the Bay of Biscay ... miles from St. Nazaire ... taken ... Bordeaux ... None.

1929 — 1933					1934 — 1936					1937 Fleet
Alaskan 2nd					Alaskan 2nd					Alaskan 2nd
Arizonan 2nd				xx1929	Arizonan 2nd	**1934				Arizonan 2nd
American 2nd					American 2nd					American 2nd
Californian 2nd					††Californian 2nd					Californian 2nd
Columbian 2nd					Columbian 2nd					Columbian 2nd
Dakotan					Dakotan					Dakotan
Georgian 3rd				xx1929	Georgian 3rd	**1936				Georgian 3rd
Hawaiian 2nd					Hawaiian 2nd					Hawaiian 2nd
Iowan					Iowan					Iowan
Kansan 2nd					Kansan 2nd					Kansan 2nd
Kentuckian					Kentuckian					Kentuckian
Mexican					†Mexican					Mexican
Minnesotan					Minnesotan					Minnesotan
Missourian 2nd					††Missourian 2nd					Missourian 2nd
Montanan 2nd					Montanan 2nd					Montanan 2nd
Nebraskan 3rd					Nebraskan 3rd					Nebraskan 3rd
Nevadan 3rd					Nevadan 3rd					Nevadan 3rd
Ohioan					Ohioan	††Lost 1936				
Oregonian 2nd					Oregonian 2nd					Oregonian 2nd
Panaman					Panaman					Panaman
Pennsylvanian					Pennsylvanian					Pennsylvanian
Texan					†Texan					Texan
Virginian					†Virginian					Virginian
					Diana Dollar	Ex Cathay	#1921	C	*1936	Alabaman
					Margaret Dollar	" Celestial	1921	C	*1936	Arkansan
					Melville Dollar	" Oriental	1921	C	*1936	Carolinian
"WILLIAMS" FLEET:					Stuart Dollar	" Mandarin	1921	C	*1936	Floridian 2nd
Willhilo	Ex Conshohocken	#1920	B	x1929	Willhilo 2nd	***1934			**1936	Indianan
Willsolo	" Cajacet	19[illegible]	B	x1929	Willsolo 2nd	***1934			**1936	Ohioan 2nd
Willzipo	" Eastern Mariner	1920	B		Willzipo				**1936	Washingtonian 2nd
Willkeno	" Eastern Light	1918	B		Willkeno				**1936	Isthmian 2nd
Willboro	" Eastern Admiral	1920	B		Willboro				**1936	Coloradan 2nd
Willfaro	" Richmond Boro	1919	H	oo1933						
Willpolo	" Yaphank	1919	H	oo1933						
"O & O" OCEANIC FLEET										
Golden Fleece	Ex Dewey	#1919	G		Golden Fleece				***1936	Louisianan
Golden Harvest	" West Celera	1920	G		Golden Harvest				***1936	Oklahoman
Golden State	" West Carmona	1920	G		Golden State		oo1936			
Golden Bear	" West Cajoot	1919	H		Golden Bear		oo1936			
Golden Eagle	" West Conob	1919	H		Golden Eagle		oo1934			Operated by Mat. Nav. Co.
Golden Kauri	" West Elcajon	1918	G		Golden Kauri					Golden Kauri
Golden West	" West Ivan	1920	G		Golden West					Golden West
Golden Coast	" West Nivaria	1920	F		Golden Coast					Golden Coast
Golden Cloud	" West Sequana	1919	F		Golden Cloud					Golden Cloud
Golden Cross	" West Henshaw	1919	F		Golden Cross					Golden Cross
Golden Forest	" West Togus	1919	F	††Lost 1929						
Golden Rod	" West Islip	1919	E		Golden Rod	oo1934				Operated by A-H S.S. Co.
"O & O" ORIENTAL FLEET:										
Golden Hind	Ex West Faralon	#1921	A		Golden Hind					Golden Hind
Golden Dragon	" West Chopaka	1921	A		Golden Dragon					Golden Dragon
Golden Mountain	" Bearport	1920	E		Golden Mountain					Golden Mountain
Golden Sun	" West Prospect	1921	A		Golden Sun					Golden Sun
Golden Horn	" Crisfield	1919	D		Golden Horn					Golden Horn
Golden Tide	" Montague	1919	E		Golden Tide					Golden Tide
Golden Star	" Elkridge	1919	D		Golden Star					Golden Star
Golden Peak	" Crosskeys	1919	C		Golden Peak					Golden Peak
Golden Wall	" Pawlet	1920	F		Golden Wall	oo1934				
Golden River	" Diablo	1919	D	****1929	Golden River		oo1934			

DWT A—11000 B—10500 C—10000 D—9600 E—9400 F—8800 G—8600 H—7500 † Twin Screw, others single screw. ‡ Motorship, others reciprocating

See chart compiled January, 1929, for the early history of the American-Hawaiian Steamship Co., and the purchase of the O & O, and Williams ships.
The above deadweight tonnage is approximate on account of variations between the timber load line, general merchandise, etc. drafts.
The OREGONIAN, built in 1901, renamed the COLORADAN in 1922, laid up at S.F. in 1923; sold in 1926—accounts for the name COLORADAN 2nd.
Purchased * from the Dollar Steamship Company. ** from the Williams S.S. Corp. *** from the O & O Nav. Co. **** from the Gen. Engineering & D. D. Co.
Sold o to the Williams S.S. Corp., oo to the Pan-Atlantic S.S. Corp., ooo to the Matson Nav. Co.
Chartered x to the American-Hawaiian S.S. Co., and names changed xx from the Williams S.S. Corp.
Stranded † July, 1929, on the Aleutian Islands, given up, Sept. 1929.
†† October, 1936, on the Seal Rocks, S.F. given up (sold) October, 1936.
Built # on the dates shown.
The American-Hawaiian Steamship Co's. ships operate in the North Atlantic Intercoastal Service.
The Williams Steamship Corporation's ships (purchased 1929) by the A-H S.S. Co. operated in the South Atlantic Intercoastal Service as a "B" Line. All the ships, with names changed, as shown above, placed in the Am. Hawaiian fleet, Dec., 1936—continuing to operate in the South Atlantic Intercoastal Service.
The Oceanic & Oriental Nav. Co's. ships were purchased jointly in 1928 by the American-Hawaiian S.S. Co. and the Matson Navigation Co., with the American-Hawaiian operating half the fleet of 21 ships in the Oriental "Japan North China Service" and the "South China Philippine Service", and the Matson Nav. Co. operating half in the Oceanic (Antipodes) Service.

Deceased: Cary W. Cook, former President, S. F., Dec., 1936; J. D. Tomlinson, Vice President, N. Y., Dec., 1933; A. P. Zipf, Vice President, Williams Steamship Corporation, S. F., Oct., 1936; Captain F. J. Bennett, Atlantic Coast Operating Manager, N. Y., March, 1937.

EXECUTIVE OFFICERS

Roger D. Lapham, President	1925
Edward P. Farley, Chm. Exec. Com.	1928
John E. Cushing, Vice President	1926
W. S. McPherson, Vice President	1931
Thomas G. Plant, Vice President	1935
D. S. Morrison, Vice President	1937
W. J. Mahoney, Sec. Treas.	[illegible]

PURCHASE RECORD

Alabaman	Ex Diana Dollar
Arkansan	" Margaret Dollar
Carolinian	" Melville Dollar
Coloradan 2nd	" Willboro
Floridian 2nd	" Stuart Dollar
Indianan	" Willhilo 2nd
Isthmian 2nd	" Willkeno
Louisianan	" Golden Fleece
Ohioan 2nd	" Willsolo 2nd
Oklahoman	" Golden Harvest
Washingtonian 2nd	" Willzipo
Willhilo 2nd	" Golden Wall
Willsolo 2nd	" Golden Rod

Full Steam Ahead

Merchant Marine Officers' Club

In the January, 1937, issue of Pacific Marine Review there appeared "An Open Letter to American Ship Officers," written by a chief engineer. This article depicted the need for all licensed personnel of the Merchant Marine to get together and form a social organization which would tend to uplift the standards of the licensed personnel . . . to help them maintain the respect which their position demands.

No sooner had this edition of the magazine gone through the mails than replies began to pour in from licensed officers in all parts of the United States, and many from foreign ports. This display of interest was due compensation to the writer of the original open letter. Knowing that his idea had appealed to men on ships all over the world, he decided that a club of this kind was bound to succeed.

And so all the men who had replied to the open letter were invited to attend the first meeting of the Merchant Marine Officers' Club, of San Francisco, which was held in the Whitcomb Hotel, San Francisco, on Friday evening, January 29.

At this meeting an election of officers and appointment of a Board of Governors took place. These officers and governors are to act as such until the group is sufficiently organized to hold a permanent election. The following officers were chosen:

F. J. Cordall, president.

A. R. Bunker, secretary-treasurer.

William Don, club manager.

Members of the Board of Governors are: Captain T. H. Dobson, S. A. Bylander, Robert Rolicheck, and Clyde F. Williamson.

There have been weekly meetings of the Board of Governors from that date on. The enthusiasm displayed by the licensed personnel afloat and ashore has been converted into an active organization with one purpose in mind—that is, to give the licensed officer of the American Merchant Marine a club for pleasant social contacts, with clubrooms where he may meet his fellow-officers and friends, game rooms for his diversion when he is on shore, a dining room, and a bar, where he may feel completely at home.

At a recent meeting of the Board of Governors a set of by-laws was officially adopted. We feel it important to quote excerpts from the first two sections of these by-laws:

"Article I—Name and Object.

"Section 1. This organization shall be known as the Merchant Marine Officers' Club of San Francisco, as set forth in the articles of incorporation.

"Section 2. The object of this Club shall be the promotion of social intercourse among its members, thereby maintaining the social and official standing of licensed officers of the American Merchant Marine.

"Section 3. The functions of this Club shall be strictly social, being and remaining absolutely non-partisan and having non-political interests. The Clubrooms shall at no time whatsoever be the meeting place of any political or partisan group or organization.

"Article II—Members.

"Section 1. There shall be two main classes of membership: Active Members and Associate Members.

"Section 2. The active membership shall consist of three classifications: Active Life Members, Active Charter Members, and Active Members. Life Members shall be restricted in number, for the present, to 250, this number subject to change by the Board of Governors. The fee for life membership shall be $100.00, subject to change from time to time by the Board of Governors. Charter membership shall be limited to 25 members. The fee for Charter Membership shall be $25.00. This particular classification of the membership shall remain fixed at the above rate and shall not be subjected to any further assessments. All three classifications of the Active Membership shall be comprised of licensed officers of the Merchant Marine, proved as such, whose applications have been duly passed and approved by the Board of Governors. Dues for the active membership shall be $12.00 annually. All three classifications of the Active Membership shall be vested with voting power.

"Section 3. Associate Membership shall consist of two classifications: Associate Life Members and Associate Members. The number of Associate Life Mem-

READY TO BACK HIS OPINION.

At Sea, February 17, 1937,
Bound for Honolulu.

TO THE AUTHOR OF THE OPEN LETTER TO AMERICAN SHIP OFFICERS.

Dear Sir:

The above letter in the January issue of Pacific Marine Review hits at the heart of the one need uppermost in my mind for years.

I left the sea for a few years and am back once more. I hold a Chief Mate's ticket and am soon due for raise of grade.

When you are ready to start that Club, I wish to be one of the Charter Members, and you can depend on me for the sum of $100.00, not as a loan or as dues, but as a gift to get it under way.

Chief Mate.

bers shall be restricted at the discretion of the Board of Governors. The Associate Membership at large shall be comprised of such persons directly connected with, or interested in, the marine business. All applications for such membership must be passed and approved by the Board of Governors, who will determine their eligibility. The fees for Associate Members shall be $12.00 annually. They shall enjoy the same privileges as the active membership, as set forth in Article II, Section 2, with the exception that they will have no voting power and shall not be eligible to hold office."

Any newly formed organization of this kind is undoubtedly the victim of some suspicion, but we feel certain that upon reading the above articles as set forth in the by-laws of the club, any right-minded individual will admit that it is made perfectly clear that this club will be at all times under the control of the licensed officers who form the active membership, and as such have the only voting power.

Clubrooms at 112 Pine Street, San Francisco, are at present being considered as the quarters for the club. When completed, there will be attractive lounges, meeting rooms, billiard room, dining-room, bar, and any necessary conveniences to further social intercourse among the club members.

This small group of men is working hard and fast to accomplish its dream—the Merchant Marine Officers' Club of San Francisco, and already many applications for membership have been filed and approved. Membership application blanks are now obtainable upon request. The fees amount to only one dollar a month, a very nominal sum when the many advantages the club has to offer are taken into consideration.

Beside being open to its members, the Officers' Club will issue guest privileges to officers of foreign ships while they are in this port, and to the friend of a member, provided that he is introduced and sponsored by the member.

So, to the licensed officers of the American Merchant Marine, we say: Get behind this club 100 per cent and let it work for YOU!

Until permanent quarters are established, any correspondence will be received by addressing the Merchant Marine Officers' Club, 500 Sansome Street, Room 701, San Francisco, Calif.

L. M. Goldman,
Recording Secretary.

Pacific Merchant Marine Licenses

A Record of New and Raised Grade Licenses for American Deck and Engineering Officers

Name and Grade	Class	Condition
SEATTLE		
Andrew Johnson, Second Mate	OSS, any GT	RG
Russell H. Faulkner, Second Mate	OSS, any GT	RG
Thrond Throndsen, Second Mate	OSS, any GT	O
Grant H. Gibson, Third Mate	OSS, any GT	O
Jack B. Hold, Third Mate	OSS, any GT	O
Philip M. Taylor, Jr., Third Mate	OSS, any GT	O
Lester F. Kerton, Third Mate	OSS, any GT	O
Rudolph Schmits, First Asst. Eng.	OSS, any GT	RG
Frank J. Harrington, First Asst. Eng.	OSS, any GT	RG
Raymond E. Pearce, 3rd Asst. Eng.	OSS, any GT	O
Johnny Wilson, Third Asst. Eng.	OSS, any GT	O
HONOLULU		
Mervyn W. Verran, Chief Mate	OSS, any GT	RG
Frank Stanczak, Second Asst. Eng.	OSS, any GT	O
SAN FRANCISCO		
Fredk. T. Hawkesworth, Chief Mate	OSS, any GT	RG
Lee G. Clements, Chief Mate	OSS, any GT	RG
George S. Center, Second Mate	OSS, any GT	RG
William J. Ross, Second Mate	OSS, any GT	O
Rolf H. Iverson, Second Mate	OSS, any GT	RG
Robert I. Cryster, Third Mate	OSS, any GT	O
Charles H. Arnold, Chief Eng.	OSS, any GT	RG
Fred H. Brewster, Chief Eng.	OSS, any GT	RG
Theodore Hall, First Asst. Eng.	OSS, any GT	RG
Gustaf W. Peterson, Sec. Asst. Eng.	OSS, any GT	O
John P. Gillen, Second Asst. Eng.	OSS, any GT	O
John E. Robertson, Second Asst. Eng.	OSS, any GT	O
Robert F. Spear, Second Asst. Eng.	OSS, any GT	RG
Manney Swerdlin, Chief Eng.	OMS, any GT	O
Ralph W. Dale, Jr., Chief Eng.	OMS, any GT	O
PORTLAND		
Gilbert P. Earle, Master & Pilot	OSS, any GT	RG
Edward Georgsen, Master	OSS, any GT	RG
David E. Dickson, Second Mate	OSS, any GT	RG
John A. Logan, Chief Eng.	OSS, any GT	RG
Stanley Hansen, Second Asst. Eng.	OSS, any GT	O
ALASKA		
Fred Lingenfelter, Third Asst. Eng.	OMS, any GT	O
LOS ANGELES		
William J. Atkinson, Second Mate	OSS, any GT	RG
George L. Cameron, 2nd Class Pilot	OSS, 150 GT	O
Walter C. Sheets, Chief Eng.	OSS, any GT	RG
Wilfred H. Babcock, Chief Eng.	OMS, 750 GT	O
Frederick W. Moe, Chief Eng.	OMS, any GT	O
Richard Greyfield, Chief Eng.	OMS, 750 GT	O
William J. Pike, Chief Eng.	OMS,1500 GT	O
Paul R. Logan, Chief Eng.	OMS, 300 GT	O
Harry Rowan, Sec. Asst. Eng.	OSS, any GT	O
William C. Earley, 3rd Asst. Eng.	OSS, any GT	O
John T. Galvin, 3rd Asst. Eng.	OSS, any GT	O
Burrell B. Norris, 3rd Asst. Eng.	OSS, any GT	O

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Reversing Marine Diesel Engines

A decision of a Federal Admiralty court on the investigation into the collision between the U. S. cruiser Chicago and the British motorship Silverpalm (off Point Sur, California, October 24, 1933) declared the motorship solely in fault, and among other points indicated that the diesel engine fitted in this motorship is not readily reversible at more than moderate speeds and "is dangerous in a situation of emergency which requires prompt reversal." This decree, dated December 28, 1935, has recently been disinterred by certain "debunking" journals and given much publicity in a manner which indicates that the intent is to disparage all diesel engines for marine propulsion purposes.

There are, of course, several types of diesel engine, and many varieties under each type. That the problem of direct reversal of these numerous varieties has been solved to the satisfaction of shipowners is evidenced by the rapidly increasing fleets of motorships of all sizes, powered with various engines, that are today trading in all the sea lanes, as well as on all the lakes, rivers, and harbors of the world. In sizes up to 150 to 200 horsepower it is the usual practice to reverse the propeller rotation by means of mechanical gearing inserted between the engine and the tail shaft. In larger sizes the engines are fitted with mechanism for reversing the engine itself by manipulation of the valve gear.

There is no ship service where maneuverability is more important than on ferry runs across crowded navigable waters. On such service the run sometimes becomes a continuous succession of engine bells. If the diesel engine were unreliable in its reversing power we would expect to see the ferries eliminating the diesel as a main propulsion unit. But a casual survey shows that the diesel is a particular favorite with ferryboat owners.

A recently much publicized ferry is Kalakala, the streamlined beauty of the Puget Sound Navigation Company, illustrated herewith. This ship makes the run from Seattle to Bremerton on a 45 minute schedule, which calls for a speed of 17½ knots. This run is through waters which are normally quite active with shipping.

Kalakala is a large vessel for a ferry. Her heavy steel hull is 276 feet long, 55 feet 8 inches beam, with 21 feet 6 inches in depth of hold. Her normal load draft is 13′ 0″, and her capacity is 2,000 passengers and 110 automobiles.

She is powered with a 10 cylinder (19½ inch bore by 27 inch stroke), two cycle, trunk piston, mechanical injection, directly reversible Busch-Sulzer diesel engine which normally develops 3,000 B.H.P. at 230 r.p.m., and can easily develop 3,600 B.H.P. At her normal power she easily makes 17½ knots speed.

This ferry has never had any difficulties in prompt reversals or in any other maneuvers. However, after hearing many comments concerning the court decision mentioned above, the Puget Sound Navigation Company decided to conduct a test as to the time required for stopping the Kalakala when going at full speed ahead. This test was made on February 3, 1937, when the ferry had been in operation nearly two years.

Here is the captain's report of the result:

"The Kalakala, going full speed ahead, was given the full astern bell at 2:27 P.M. The engine was reversed in four seconds. The vessel was completely stopped at 2:28.5 P.M. The distance traveled to stop vessel was approximately 800 feet."

The engine of the Kalakala is directly coupled to one screw propeller, and her sole reliance in reversing is the valve gear adjusting mechanism of the engine, which throws all ten cylinders into reverse power operation in four seconds, as stated above. This engine was chosen by the Puget Sound Navigation Company with a full realization of their responsibility to their patrons and to the authorities. Their choice was based on their own experience with a 2,200 shaft horsepower engine of the same type and make on their motor ferry Chippewa, which at the time had three years' operation and over 230,000 miles of travel to her credit.

Maneuverability in any engine is largely a factor of the machanical design. The method by which heat energy in fuel is released as expanding gas has no bearing on the problem of reversing the mechanism.

Self Unloaders Pay Dividends

The key to the success of cargo transport by water is quick turn around at ports. This is true for all voyages, but is more particularly important on short coastwise runs. The best demonstration of this fact is in the bulk carrying cargo vessels of the Great Lakes.

About a generation back these bulk cargoes were mostly trimmed by hand labor in the hardest longshoreman grind that existed in the world. For some years past this hand labor has been reduced to a minimum by the use of self-trimming holds and tremendously powerful shoreside unloaders, which handled, weighed, and deposited in cars or on piles a shipload of iron ore, coal, or limestone in less than a longshoreman's working day.

More recently new ships are being built or ships converted to self-unloaders with further savings, as is evidenced by the fact that throughout the depression self-unloaders have shown a very much smaller percentage of laid-up vessels than have the older types.

Perhaps we of the ocean coasts might learn many lessons from these Great Lakes operators. Certainly the overall costs of handling coastwise cargoes could be tremendously reduced by the installation of adequately designed cargo handling machinery that would enable a cargo vessel to deposit its cargo on the pier mechanically with a minimum of longshore labor.

The experience of the American Steamship Company, managed by Boland and Cornelius, of Buffalo, N. Y., should be of great interest to Pacific Coast steamship operators at this time. This company, during the period 1932-1936, converted seven large bulk cargo carriers into self-unloaders, the work in each case being contracted for by the American Shipbuilding Company at its Lorain, Ohio, plant.

One of these vessels, the John J. Boland, was finished May 17, 1936, and some idea of the possibilities of dispatch may be obtained from the statement "Five days later she had delivered her third cargo."

John J. Boland was built at Ecorse, Michigan, in 1907. Her hull had a length of 480 feet, a beam of 54.2 feet, and a depth of 31.2 feet. She was powered with an 1800 I. H. P. triple expansion engine turning 85 r. p. m. and taking saturated steam from two hand fired coal burning Scotch marine boilers at 180 lbs. pressure.

In the conversion job, 24 feet of length was added to the midship portion of the hull and her propulsion plant given a thorough overhaul. A new high pressure valve of the American Shipbuilding Company, Bodenlos adjustable plug piston type, was installed, and new high pressure eccentrics fitted. This materially increased the horsepower developed with the same steam consumption. A Goodrich Cutless rubber bearing was fitted to the stern tube.

The main steps in conversion were: The construction of hoppers in the holds; the installation of two fore and aft belt conveyors in the tunnel, under the hoppers, for delivering the cargo to two cross conveyors at the forward end; an inclined pan conveyor, receiving cargo from the cross conveyors for elevation to the deck and then onto a boom belt conveyor for discharge

Self-unloader Consumers Power delivering a cargo of limestone.

on shore; a substantial "A" frame for lifting and staying the boom; and the selection and installation of electric generators and motors for all of the required operations.

The 42-inch hold belt conveyors are each driven by an Elliott 75-hp., 900-r.p.m., 440-volt, 3-phase, 60-cycle, slip-ring induction motor.

From the cross conveyors, which are driven from the hold conveyors, the material is elevated to the deck by means of a steel pan conveyor, 96 inches wide, driven at a speed of 85.3 feet per minute by an Elliott 200-hp., 720-r.p.m. slip-ring induction motor with a solenoid operated brake. Located at the head end, the motor drive operates through a Morse silent chain and a Robins-Falk herringbone reduction gear.

The boom conveyor belt is driven from the lower end through spur gear transmission by an Elliott 250-hp., 720-r.p.m.slip-ring induction motor which is also equipped with a solenoid operated brake. The boom is 200 feet long and swings through an arc of 226 degrees.

A considerable amount of power is required for operating all this self-unloading equipment. Since this power is practically never required when the vessel is under way, the source of power for the main propelling machinery can be used. The only question, therefore, is whether or not to use steam from the main boilers directly, or in the form of electrical energy. In all of the conversions of the American Steamship Company, electrical power has been used because of the conviction, fully demonstrated in actual service, that it is more economical, more flexible, and easier to operate.

To furnish the electrical energy, an Elliott 500-kw., 3600-r.p.m., 480-volt, 3-phase, 60-cycle, condensing turbine-generator set was installed. The after bulkhead in the engine room was cut through and finished as an open archway to the generator flat. This arrangement, which gives ample room while at the same time conserving space, could hardly have been improved upon even in a new ship.

Steam for operating the turbine-generator is taken from the main boilers in saturated condition at a pressure of 170 pounds per square inch. The steam capacity of the main boilers is more than double the requirement for the generator set, and one boiler can be shut down, if desired, while the ship is unloading. Exhaust steam from the turbine-generator passes into an Elliott 750-square feet surface condenser, operating at 26-inch vacuum.

The main conveying machinery control switchboard is located in a steel enclosed space on the starboard side of the main deck forward. For operating the boom and pan conveyors, there are control stations on the spar deck, port, and starboard. The control station for operating the hold conveyors is located at the head of the system. The operator stands in a dust-tight cab with two windows in the after wall, giving a clear view of the cross conveyors discharging to the pan conveyor.

Unloading operations are controlled from three main positions, two on deck and one below deck. From his position in the cab below deck, the operator has full control of the hold conveyors, which can also be stopped at any time, from any point in the tunnel, by using a pull cord. At each of the three control stations there is a push button for actuating flashing signal lights in the tunnel. In this way, by adopting a code of signals, the chief operator is in control of the entire unloading system. The operation of each conveyor is independent or in sequence. Should any conveyor be stopped, the conveyors behind also stop automatically, but the conveyors ahead continue to run.

Because of the unusually heavy lighting load, which is at least four times that of an ordinary freighter, two Elliott 50-kw., 125-volt, direct-current generators were installed. They are located in the fantail, forward of the main generator. Under normal circumstances, only one of these generators is in operation while the other is in reserve. It is an extra precaution against the possibility of delay due to failure of power for lighting; an indispensable essential for operation, particularly so for unloading at night, which is frequently done.

Throughout the main operating tunnel there is a double row of lights. Single rows of lights are fitted in the outboard tunnel, starboard, and port. Lights have also been installed directly over the conveyor belts, between the hoppers. The latter, in addition to lighting, are used for flashing signals from the chief operator in the control cab to the gate operators in the tunnel. Adequate illumination is also provided for the head end of the hold conveyors and the cross conveyors. Powerful flood lights are installed at various points of vantage on the "A" frame and boom. There is also extra lighting on deck.

The main switchboard is located in the engine room, on the starboard side of the main deck. On this board are centralized the controls for the main and auxiliary generating sets and the distribution of light and power circuits. The power mains, 480 volts alternating current and 125 volts direct current, lead from this point to the conveyor control switchboard on the main deck forward.

Remarkable records have been made by self-unloaders on the Great Lakes. For instance, one vessel in a season of 240 days loaded and delivered 110 full cargoes.

The designed discharge rates for the John J. Boland are 1800 long tons per hour of limestone at 90 pounds per cubic foot, and 1120 short tons per hour of coal at 50 pounds per cubic foot. The conveyors will maintain 20 per cent overload. An actual cargo of 7830 short tons of coal was completely unloaded in five hours 52 minutes elapsed time, including 27 minutes of shutdown. This gives an actual rate of 1490 short tons an hour operating time.

Magnus Announcement

The Magnus Chemical Company, with headquarters in Garwood, New Jersey, and offices at all major seaports on both the Pacific and Atlantic Coasts, announces the association of W. C. "Bill" Grundell in charge of the marine department for the San Francisco Bay area. Mr. Grundell's experience with shipping and allied industries covers many years of contact with vessel owners and operating staffs.

Port of Portland Notes

Edward S. Coates

Feltre-Edward Luckenbach Collision—Collision of the Italian motorship Feltre and American steamer Edward Luckenbach in the Columbia River near Prescott, 42 miles below Portland, February 17, without injury or loss of life to either crew, prompted a series of events that promises to continue in the courts for many months. The Feltre sunk in 39 feet of water, a hole 250 feet long having been slashed in her starboard side, and the Luckenbach suffered bow damage necessitating $25,000 in repairs. Feltre refloating and repair costs were estimated at $325,000.

State and Federal investigators extracted contradicting statements regarding a mix-up of signals from the pilots of the two vessels, which met nearly head-on, and the state pilot board finally suspended the license of Captain Isaac Turppa, the Feltre's pilot, for 90 days. The case of Captain George McNelly, the Luckenbach pilot, operating under a federal license, was referred to Washington.

Pacific Salvage Company, Victoria, B.C., and Columbia River Salvage Company, Portland, undertook to refloat the Feltre on a no cure-no pay basis. The hole was patched and pumps installed to pump out the water sufficiently to float her to Portland drydock for repairs. Suit for $950,000 damages was started by Feltre representatives against Luckenbach Steamship Company.

Few Serious Wrecks In River—Since 1900 no less than 90,000 ocean vessels have traversed the 110-mile riverway between Portland and Astoria, a total of 10,000,000 miles, and only four serious accidents have occurred in that time. Prior to the Feltre-Edward Luckenbach collision, serious accidents were the sinking of the Welsh Prince by the Iowan in 1922; sinking of dredge Portland by the Santa Clara, also in 1922; and collision of the dance barge Swan and steamer Davenport in 1930; with a loss of 18 lives in the three collisions.

Coastwise Line Names Its Ships—Using the prefix "Coast" to signify its service, the new Coastwise Line named its six steamers after important Pacific Coast occupations. The vessels, ex-Swayne & Hoyt steamers, are the Coast Shipper (ex-Point Sur), Coast Trader (ex-Point Reyes), Coast Merchant (ex-Point Montara), Coast Banker (ex-Point Bonita), Coast Farmer (ex-Point Arena), and Coast Miller (ex-Point Gorda). They started their new service during the last week of March.

Hector M. Hunt, president of the Coastwise Line, and his office staff, established themselves in a suite of offices in the Columbia Basin Terminal, ex-Admiral Line terminal, which was renovated and modernized at a cost reported at $100,000.

Hammond Renames New Ships—Christenson-Hammond Line renamed the ex-Nelson steamers Jacox and Glymont, purchased recently, Portland and Arcata respectively, and placed them in its Portland-Los Angeles-San Francisco coastwise service. Both vessels were built at Portland in 1919, are 300 feet long, and are registered at 1620 tons net.

W. L. Williams, district manager for Hammond Shipping Company, announced that these ships made possible increasing frequency of sailings to two each week in each direction.

Harkins Line Suspends—After 23 years of Columbia River service between Portland and Astoria, Harkins Transportation Company suffered economic troubles during the maritime strike period and became the victim of a foreclosure suit against its two boats, the diesel boat L. P. Hosford and steamer Georgianna.

Mrs. Cornelia Lewthwaite, principal stockholder, was the mortgage holder who sought complete ownership of the craft. They were tied up until early March, when the Hosford was turned over to Shaver Forwarding Company to operate in a general cargo and petroleum service between Portland and lower Columbia points.

Organized in 1914 by L. P. Hosford, L. O. Hosford, A. J. Lewthwaite, and others, the Harkins Company operated many famous boats on the river, among them the Lurline, Undine, Beaver, Madeline, and Jesse Harkins.

Shipping Men Hold Hi-Jinks—Foiled in their plans to hold their annual parties during the winter season by a pocket-book flattening strike, both Portland Shipping Club and the Portland chapter, Propeller Club of the United States, held their fun-fests during the last half of March.

The shipping club, 300 strong, embarked on its "annual cruise" March 20, with dinner tables designated as ships, crews signed-on formally, and required to carry "insinuous discharge books," and all hands required to pass the necessary bar. A brilliant song and dance program, featured by a "dance of the blushing bride," kept up interest until a late hour.

The Propeller Club held its annual dinner March 27 and re-elected its former officers for another term. This, too, was principally a good-time affair. Officers re-elected were **Kit C. Conyers**, McCormick Steamship Company, president; **Willis K. Clark**, States Steamship Company, vice-president; **Phil Thurmond**, Portland Chamber of Commerce, secretary; **Phillip H. Carroll**, Commission of Public Docks, treasurer; **L. R. Gault, A. B. Natland, H. T. Shaver, Dan E. Gould, John H. Nolan**, and **Vance D. Trout**, governors.

Engineers Plan Big Tug—Plans have been prepared for an 82-foot wooden diesel tug for use by the 1st Portland District, United States Engineers, in towing river dredges on the Columbia River. The boat is expected to be built during the last half of 1937 at a cost, complete, of about $75,000. The tug will replace the H. M. Adams, a 78-foot tug, which was transferred recently to the San Francisco District. Specifications will require a diesel motor of not less than 300 horsepower be installed, and for construction of the hull from Port Orford cedar, with teak trim, and of the house of fir.

Seagoing Dredge Assigned—The shallow draft seagoing dredge Pacific, under construction by the Union Plant, Bethlehem Shipbuilding Corp., Ltd., San Francisco, at an estimated cost of about $700,000, will be assigned to the 1st Portland District, United States Engineers, for use in dredging in shallow harbors along the Oregon coast. The craft will be 180 feet long, have a light draft of six feet, and loaded draft of 10 feet, with a capacity of 500 yards of material. It will carry a crew of 36 men, most of which will be recruited at Portland. U.S. Engineers office reports that the boat will be completed next fall, be assigned during the winter season to the Sacramento River, California, and be delivered to the Portland District in the spring of 1938.

States Sells Pennsylvania—States Steamship Company has sold its steamer Pennsylvania to Weyerhaeuser Steamship Company and chartered its steamer Washington to the same company for a two-year period. Previously it sold the New York to Waterman Steamship Company, of Mobile, Alabama. The sales and charter were made, according to President Kenneth D. Dawson, because these 410 foot freighters were not needed in the company's transpacific line. Shortly thereafter, the States Company's California and Eastern service chartered the steamers Admiral Gove and Admiral Nulton to load full cargoes of newsprint pulp at Port Angeles, Washington, for East Coast delivery, and to return with general cargo.

Wheat Movement Brisk—The only deterrent to an extremely heavy eastward movement of Oregon and Washington wheat out of Portland, and Vancouver, Washington, has been the inability of grain shippers to find ships suitable for full cargo charters. Seven cargoes were loaded recently, however, these including the steamers Eastern Glade, Admiral Wiley, Admiral Senn, and Admiral Y. S. Williams, all for Bulk Carriers Corporation and Continental Grain Company; the New York and Sutherland, for Cargill, Inc.; and Tanana for Kerr, Gifford & Company. Additional charters were expected to be announced as rapidly as ships were found available.

Portland Personals—**Edward S. Coates**, auditor for the Waterfront Employers of Portland for two years, was elevated to the managership of the association upon the retirement of **R. E. Borchgrevink**, who resigned to accept a position with the Johnson Line (Swedish). Mr. Coates is a shipping man of 20 years experience, starting at Seattle and coming to Portland in 1925 as representative of Walker Shipping Company and the T. K. K. Later he was agent for the Cascade Line.

Mr. Borchgrevink, accompanied by his wife and daughter Betty, sailed for Sweden on the liner Buenos Aires.

Harold B. Veith has been transferred from the Tacoma office to Portland as city passenger agent for the Dollar and American Mail Lines. He has been with these lines for fourteen years.

James B. Foran, formerly Los Angeles traffic agent for Norton, Lilly & Company, has been transferred to Portland as traffic manager for the Columbia River district.

Returning from a tour of western and southern Oregon, **George Paradis, Jr.**, traveling passenger agent for Dollar and American Mail Lines, reported prospects of a bumper tourist crop this year.

Bow of S.S. Edward Luckenbach, at left. Motorship Feltre, below.

Marine Insurance Review

The Automatic Radio Alarm

A New Device for Insuring Continuous Radio Watch on Cargo Vessels Employing Only One Operator

Radio science has just made available to American shipowners a new radio device for the protection of life at sea that listens, thinks, and acts without human attendance. The device is known as an automatic radio alarm, and is intended for shipboard service in "standing watch" for emergency calls from other vessels at all times when the radio operator may be off duty.

Charles J. Pannill, president of the Radiomarine Corporation of America, said that the new alarm had received the approval of the Federal Communications Commission, and that the company would be ready to commence equipping ships as soon as a few minor changes specified by the Commission had been made. This approval was granted after the equipment had received a rigid sixty-day test, both in the Bureau of Standards laboratories and in a practical test conducted by the engineers of the FCC in the Sandy Hook Stations of the U. S. Coast Guard.

"We call it an automatic radio alarm," said Mr. Pannill, "but you will see that it is even more than that name implies as you consider some of the specifications for its performance.

"Upon completion of his watch at the radio, the operator turns on the automatic alarm and leaves the cabin. Thereupon the alarm begins its work of listening for the telegraphic characters of the international emergency signal from other vessels. It is contrived to receive not only the 600 meters distress call wave length, but a small band on either side as well, so that it may not be deaf to a ship which may be a little off the calling wave. It is set to 'recognize' a series of dashes, each of four seconds duration, separated by an interval of one second. It is also endowed with the discretion of recognizing a dash which may be a trifle less or a trifle more than four seconds in length. It has an electrical memory that will retain four such dashes in sequence, after which it will ring bells and turn on warning lights in the radio operator's sleeping quarters and on the bridge.

"But this is not all that is required of the new device. It must let the deck officer on watch and radio operator know immediately if it should become incapacitated for assigned duties while on watch. Accordingly, if a battery fails, or a tube burns out, or if it develops other 'pains in its sawdust,' it will operate the same alarm, bringing human intelligence on the run to its assistance."

The Convention of Safety of Life at Sea was ratified last June by the U. S. Senate and promptly signed by the President, after which it was deposited at London. It became applicable to American ships on November 7, 1936, except as to the continuous watch requirement. Under the terms of the Convention, a signatory nation may grant to its ships an exemption from the continuous watch requirement for a period not exceeding one year from the effective date of the Convention. The Federal Communications Commission has extended this period of exemption under the continuous watch requirement to and including August 6, 1937.

Under the law the new device will not be recognized on American passenger ships as a substitute for radio operators, but may be used on cargo vessels of 5,500 gross tons or over employing only one radio operator, in order that a continuous watch may be maintained.

Marine Insurance Notes

Marine Insurance Act 1937. On March 8 Representative Feruandey (Democrat) of Louisiana introduced a bill (H. R. 5421) which proposes to place all marine insurance companies doing business in the United States under regulation by the Interstate Commerce Commission. This bill, known as the Marine Insurance Act of 1937, if enacted, would become Title III of the Interstate Commerce Act.

Under the provisions of this bill the Interstate Commerce Commission would have regulatory jurisdiction over marine insurance underwriters, marine insurance brokers, and marine insurance agents, as well as marine insurance companies. If passed, it will become effective on January 1, 1938 or, at the discretion of the Commission, not later than July 1, 1938.

Pacific Marine Moves. On March 1 the Pacific Marine Insurance Agency moved into spacious new quarters off the lobby of the Merchants Exchange Building. This agency, under the able management of Ivan M. Kemsley, represents several American insurance companies, with combined admitted assets in excess of $125,000,000, and writing ocean marine, inland marine,

and all risk policies. The former location of Pacific Marine was in the Adam Grant Building.

Feltre Salvage. The Italian motorship Feltre, sunk in the Columbia River after collision with the American steamer Edward Luckenbach, has been raised very cleverly by the Pacific Salvage Company, and was towed to the Portland drydock at St. Johns. The collision tore side plating loose for a length of 240 feet. This huge hole was temporarily stopped by the "panel" method, and she was pumped out and floated, as described in our Portland notes in this issue.

Her hull insurance is carried in Italy and her cargo insurance on the Pacific Coast. Undoubtedly the cargo insurers will be called upon to contribute on general average. It is generally estimated that the repairs will cost a quarter of a million dollars.

Safety Committee Officials. The Executive Safety Committee of the Pacific Coast Marine Associations lost a very efficient chairman with the recent passing of Captain F. M. Edwards. To fill this gap, the committee reorganized by electing as chairman Captain N. J. Kane, of the American-Hawaiian Steamship Company, and as vice chairman, Captain J. G. Ludlow, of the California Stevedore and Ballast Company.

New Insurance Building. The Insurance Company of North America is constructing a beautiful eight-story building at 222 Sansome Street, San Francisco.

Bridge Insurance. The directors of the bridge district that is building the Golden Gate Bridge propose to insure that structure when complete for $18,150,000. Of this total, $3,650,000 will be for coverage of use and occupancy, the remaining $14,500,000 being multi-risk and direct damage, including earthquake.

Eureka Boiler Announcement

One of California's oldest and most favorably known marine boiler and machinery building and repair plants—The Eureka Boiler Works, Inc., of San Francisco—is now under the management of Edward T. Brady and William Brady, Jr. This is the third generation of the Brady family at Eureka Boiler Works. Edward T. Brady is son of the late Edward R. Brady, who, until his passing, was president of the firm; and William Brady, Jr., is son of the late William J. (the well known "Bill") Brady, who was vice president, general manager, and sales manager extraordinary under his brother, Edward R. "Bill" Brady was also associated with the Dollar Steamship Lines in a special capacity during the period of their great expansion when they initiated the round the world cargo and passenger service. He died in May, 1926. The father of Edward R. and William J. Brady founded the Eureka Boiler Works in the late 1870s.

Murdock Murray, one of the best known marine repair experts on the Pacific Coast, is in active charge of operations. The Eureka plant, very conveniently located at 166 Fremont, near the center of the active waterfront of San Francisco, is well prepared to handle all types of ship machinery and boiler repairs, maintenance and installation work.

Trade Literature

De Laval Motor-Mounted Pumps. A 12-page booklet, letter file size, beautifully illustrated in black and red, issued by the De Laval Steam Turbine Co., and describing a line of direct connected electric motor drive centrifugal pumps.

The term "Motor-Mounted Pumps" is used to designate a combination consisting of a centrifugal pump mounted directly upon the frame of an electric motor to form a compact, self-aligned unit with only one shaft and two bearings.

The unit does not require a special foundation or sub-base, but can be attached to whatever support is most convenient, such as column, floor, wall or ceiling, and in any position, as upside down or with the shaft vertical. Also, it may be placed upon a hand truck or suspended from a sling, for portable use.

Dimensions and other details are given for pumps of capacities from 5 to 1200 gallons per minute and for heads from 10 to 230 feet, as also pipe friction tables and instructions for selecting and installing pump units. The motor may be of the open, splash-proof, totally enclosed, or explosion-proof type, and for either direct or alternating current.

Ship Design and Marine Insurance

Dr. E. Foerster, of Hamburg, designer of the Majestic and Leviathan, and consultant naval architect on the Europa and Bremen, is one of the ranking naval architects of the world. For some months he has contributed a serial article to "The Marine Underwriter" (an international marine insurance review) on the subject "Shipbuilding and Insurance." The object of Dr. Foerster in writing this article was to indicate how some features of the modern ship might be improved from the safety viewpoint with little or no additional first cost and little or no loss of revenue or increase in operating cost. We shall attempt here to summarize these articles.

Introductory to a study of ship construction from the underwriters' point of view, the author remarks:

"Classification societies and shipping supervision boards all over the world issue regulations according to which ships putting out to sea are to be properly built, not overloaded, well equipped, and so engined as to fulfill recognized technical standards. But these societies have to compromise between the interests of shipowners and shipbuilders, and their provisions often fail, in part at least, to coincide with the full degree of safety which underwriters may well be entitled to demand."

For instance, putting both engines in a single compartment in a twin screw ship, so that in the case of fire in the compartment, or collision adjacent thereto, both engines would be put out of commission and the vessel be helpless. A straight centerline water tight bulkhead is inadmissible in such space because of the unbalanced weight of water on one side of the centerline in case of flooding. By setting the engines staggered fore and aft, and putting in a water tight bulkhead on a zig zag line, the risk of unequal weights could be reduced to nothing, and the ship made much more safe in an emergency because fire or collision would put only one engine out of commission.

The hull of a ship floating in the water without cargo or fuel aboard is under constant stress because, the weight of the ends of the hull being greater than their buoyancy, and the buoyancy of the middle portion being much greater than its weight, there is a constant upward thrust on the center and a downward thrust at each end. So that her upper portion is in tension and her lower part in compression. Weight of machinery at the middle portion somewhat overcomes this tendency. In those portions of the hull where these strains of "pull and pressure" are nil, namely, the neutral axes, we often find horizontal sheer stresses causing loosening of rivets. This usually occurs about ¼ ship's length aft of stem and the same distance forward of sternpost and about half way up the sides.

"This system of strains (dragging, stretching, and pressure) becomes infinitely more complicated when the ship is out at sea."

Ship structures to take care of these complicated strains may be built either on the transverse or the longitudinal framing systems. The longitudinal system offers greater longitudinal strength with somewhat less weight.

In larger vessels with either system there has to be inner stiffening of the hull, which may be in the form of bulkheads or in the form of pillars and girders, or in a combination of both these forms. Bulkheads, of course, serve the dual purpose of stiffening and water tight subdivision.

Classification societies prescribe certain minimum standards of water tight subdivision, and a ship is classified as a one, two, three or more compartment ship according to the number of her subdivisions or compartments, which may be flooded without seriously endangering the safe stability or seaworthiness of the vessel. The matter of insulating all subdivision bulkheads so as to make them proof against the transmission of heat, as well as water tight, is now under discussion. Such insulation, which is now often practiced for passenger and crew quarters, would, if extended to the holds, not only prevent spread of fire from one hold to another but would also entirely eliminate ship sweat in way of bulkheads.

The risks of damage and total loss to the hull are of four general types, represented by stranding, collision, heavy seas, and fire.

● Damage from Stranding

Stranding, or running into a shoal or the shore, al-

ways causes local injury to the hull. In addition to local injury, there may be injury of far more serious nature affecting the ship as a whole. The extent of damage depends chiefly on character of bottom, force of stranding, on the position of the supporting point or points relative to the length of the ship, and on the tidal and wave action.

A stranded ship approximately 600 feet long and 75 feet beam would lose approximately 8,000 tons buoyancy on a tidal drop of six feet. In other words, that drop of water level would mean 8,000 tons more weight pressing on the rocks, sand, hard clay, mud, or whatever she was resting on. Such a tidal movement accompanied by 12 foot waves would cause an effect similar to that of a 2,000 to 4,000 ton press. That such ships under such circumstances on jagged rocks so soon go to pieces is easily understood.

The author's theories and his practical experience tend to show that in the risk of damage by stranding the better forms of twin screw stern are much superior to the single screw. He appeals to the underwriters to "consistently make a suitable distinction in rates in favor of twin screws with due appreciation of the fact that the promotion of this development lies definitely in their own interests."

California Marine Insurance 25 Years Ago

The marine insurance business of the State of California for the year 1911 showed better general results than for several years past. The total premiums written amounted to $2,170,761, a decrease over the previous year of $9,400, while the losses paid amounted to $1,319,785, decrease over the previous year of about $370,000. The percentage of losses to premiums was 60.8 per cent, as against 77.5 per cent for 1910 and 70 per cent for 1909.

The Western Assurance Company shows a loss ratio of about 200 per cent, but as this company stopped writing on the Coast in June, any comparison is unfair. The Thames & Mersey shows a loss of over 100 per cent for California, but taking the entire Pacific Coast business into consideration, the loss ratio falls to 39.1 per cent. With the exception of the United States, Lloyds, with a loss ratio of 97.2 per cent, and the Providence Washington and the St. Paul, both showing a loss ratio of 96.7 per cent, the companies show a marked improvement over the previous year. In fact two companies have the unique distinction of showing a profit in their loss account. This by reason of salvages recovered on account of losses paid in previous years exceeding the amounts paid out in 1911. The Federal Insurance Company, with a premium income of $5,397, had a loss ratio of about one-half of one per cent.

Wrecks and Casualties Twenty-Five Years Ago

"ROSECRANS," tank str., went ashore on the rocks near Gaviota, Cal., on March 12th, but was floated on April 2nd, and taken to San Francisco. Steamer valued at about $100,000. Not insured.

"MANCHURIA," str., while loading at her pier at San Francisco on March 17th, fire broke out in No. 6 hold and it was necessary to flood that compartment to extinguish the fire. The cargo affected consisted largely of cotton and government supplies for Manila. Damage to cargo about $60,000, and to steamer about $30,000.

"ENTERPRISE," str., from San Francisco March 23rd for Hilo, broke tail shaft and was towed back to San Francisco by the Str. "Lurline." Part of the cargo was discharged and repairs made.

"S. N. CASTLE," at Honolulu March 22nd from Fanning Island, had been ashore during the passage and part of the cargo was discharged to make repairs.

"HAZEL DOLLAR," Br. str., from Columbia River for Taku, with lumber, put back to Victoria on March 27th with rudder stock broken and other damage.

Famous picture of S.S. Rosecrans on beach near Gaviota, Cal. Went ashore March 12, 1912; floated April 2, 1912. Lost some years later on the Washington coast.

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

50,000 Gross Tons a Month

During the 30-day period from March 15 to February 15 considerable merchant marine tonnage was added to the new contract work for American shipyards. In this tonnage there appeared a new factor that is very encouraging. For over a year the new ship contracts have been coming in with fair regularity, and all of them in the large seagoing vessel classifications have been for oil tankers.

In February there appeared four quite respectable orders for cargo vessels and for three tankers.

First on the list are two bulk cargo carriers ordered by the Pittsburgh Steamship Company from the American Ship Building Company. These vessels will be 610 feet long between perpendiculars, 60 feet beam, and 32 feet 6 inches molded depth. The power plant will be a 2,000 B. H. P. geared turbine taking steam at 400 pounds pressure from water tube boilers.

Next come two single screw coastwise cargo carriers ordered from the Pusey & Jones shipyard by the Philadelphia and Norfolk Steamship Company. These vessels, designed by Theodore E. Ferris, naval architect of New York, are unusual in American practice in that the specifications call for 17 knots service speed. They will be 292 feet overall length, 48 feet 6 inches beam, with a load draft of 18 feet. Double reduction geared turbines will drive the single screw.

Two more tankers were ordered by the Gulf Oil Corporation from the Sparrows Point plant of the Bethlehem Shipbuilding Corporation, Ltd. These will be exact duplicates of the Gulf Coast and the Gulf Tide, delivered in December, 1936, and February, 1937, respectively.

Built on the Isherwood bracketless system of framing and to Isherwood Arcform design, these tankers are 425 feet long, 64 feet beam, and 34 feet molded depth. Powered with cross compound double reduction geared turbines taking steam at 725 degrees F. and 400 pounds pressure.

The third tanker on the list, a much larger ship, was ordered from the Sun Shipbuilding & Drydock Company by the Sun Oil Company. This vessel is to have a length of 542 feet 5 inches; a beam of 70 feet; a depth of 40 feet; a draft of 30 feet 2 inches; and a single screw driven by a five cylinder, 6,000 horsepower Sun-Doxford diesel engine.

These seven vessels, together with a large number of miscellaneous craft, form an aggregate addition to the work of American shipyards of more than 50,000 gross tons contracted for during less than 30 days, or at the rate of 6,000,000 gross tons per annum.

When the Maritime Commission begins to function along the lines laid down in the Construction Subsidy provisions of the Merchant Marine Act of 1936, that effort, superimposed on our present commercial boom, will be very likely to create a great demand for shipbuilding ways, and then Pacific Coast yards will be ready to build many fine ships.

Contract for Five West Coast Oil Barges Let

Contract for the construction of five all-welded, steel oil barges has been let by the General Oil Company, Spokane, Washington, to the Columbia Steel Company, Portland, Oregon. The barges are to be 90 feet long, 30 feet beam, and 6 feet deep. They were designed by H. C. Hanson, naval architect, Seattle, Washington.

New Diesel Ferryboat Delivered

The all steel ferryboat Norfolk County, built by the Maryland Drydock Company, Baltimore, Maryland, for the Norfolk County Ferries, Inc., Portsmouth, Virginia, has been completed at a cost of $250,000 and placed in service between Portsmouth and Norfolk.

The Norfolk County is built along the latest design and constructional lines. She is 175 feet long and 65 feet beam, with accommodations for 350 passengers and 40 automobiles. Power is furnished by two Fairbanks, Morse diesel engines developing 650 horsepower, driving generators that in turn drive a motor attached to the propeller shaft. A speed of 11½ knots was developed on the ferry's trial runs. The hull and superstructure are streamlined, in accordance with the present trend for ferries.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: Hull 5355—McCall (DD400). Completion date 9/19/37. Hull 5356—Maury (DD401); completion date 12/19/37; two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $2,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers.

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION: 4 keels laid July 6, 1936, Fellows Craft stock cruisers 30' x 8' x 2'6", powered with Kermath Sea Flyer 6-cylinder 85-H.P. engines with 2 to 1 reduction gears.

Five 32 ft. W.L., 46 ft. O.L. One design sloop yachts, keels to be laid in the immediate future. Auxiliary power, with small h. p.

One 60' high-speed glass bottomed sight-seeing boat powered with twin Hall-Scott marine motors. Delivery date, April, 1937.

DRYDOCK AND ROUTINE REPAIRS: Yachts Selellyn II, Conquita, Astrild, Kinkajou. Thirty-two smaller yachts and commercial boats.

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: U. S. Engineers booster barge, M.S. Nestor, Lansing, Lake Miraflores, American Fisher, Scotia, Barge No. 34, Steel Barges No. 108 and No. 109, Bertie M. Hanlon, Solano, Ryder Hanify, Tug. Col. Geo. Armistead, Elwyn C. Hale, Gas. S. Sea Star, Tug Arabs, Midway.

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: Four 80' U. S. Coast Guard patrol boats; 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; estimated launching, May, 1937; expected completion, August, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: Dickenson, M. S. Hawaiian Standard, U. S. L. H. T. Kukui.

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: S. S. Gargas; whaling vessels of American Pacific Whaling Co.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: Golden Star, L. A. Fireboat No. 2, Tug Peacock, M.V. Molokai, Derrick Barge Los Angeles, Golden Peak, Watsonville, Yacht Enchantress, M.V. Minato Maru, Edwin B. DeGolia, Jacob Luckenbach, Emergency Aid.

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Star of Holland, Gracie S. Jacox.

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: Prince George, Prince Charles; 2 scows; 3 fish boats; 19 ship repair jobs not requiring docking; 31 commercial jobs.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: U.S.S. Patterson (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 23, 1935; estimated completion date, September 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935, estimated completion date, October 1, 1937.

Construction of Destroyer No. 408, U.S.S. Wilson, 1500 tons, keel not yet laid.

DRYDOCK AND ROUTINE REPAIRS: California, Mississippi, New Mexico, Tennessee, Lexington, Indianapolis, Samuel D. Ingham.

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Keel laying begun for ten 36' and ten 29' stock keels.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: Yukon, Edward Luckenbach, West Mahwah, Point Vincente, Montanan, Nebraskan.

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: Henley, Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); keel laid January 14, 1936; launching date, March 11, 1937; estimated delivery, October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery, July, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: Dent, Rathburne, Talbot, Waters, Elliot, Hopkins, Dorsey, Milwaukee, Ramapo, Koka, Nautilus, Narwhal.

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 122, Western Flyer, purse seiner; 76' x 20'; powered by Atlas 160 H. P. engine. Owner, Anthony Berry, Tacoma, Wash. Launching date, March 3, 1937; delivery date, April 2, 1937.

Hull No. 123, Patricia, purse seiner; 81' x 20'; powered by Atlas 200 H. P. engine. Launching date, March 15, 1937; delivery date, April 15, 1937.

Hull No. 124, purse seiner; 72' x 18'; keel laid March 3, 1937; powered by Atlas 135 H. P. engine. Owner, Nick Mardesich, Everett, Wash.

Hull No. 125, purse seiner; 72' x 18'; powered by Atlas 135 H. P. engine. Keel laid March 10, 1937. Owner, John Bocaka, Everett, Wash.

Hull No. 126, purse seiner; 76' x 20'; powered by Washington 200 H. P. en-

gine. Keel laying date, April 20, 1937. Owner Peter San Felippi, Monterey.

DRYDOCK AND ROUTINE REPAIRS: Fishing boat Empress; scows Mallard and Widgeon, of Simpson Lumber Co.; ferry Pioneer.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION: 3 dump scows 114'x26'x7'9".

DRYDOCK AND ROUTINE REPAIRS: 20 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Hull No. 915, Four yard dipper dredge**; length overall 110'; breadth molded, 40'; depth molded, 8'; steel house 84'x24'x 10'3" high; no living quarters. Designed for maximum bridge clearance of 15', which requires a frame and stack to be collapsible. Scotch boiler 13' diameter by 12'10" long; 160 lbs. pressure. To be built at Buffalo. Keel laid December 20, 1936; estimated launching date, March 1, 1937; delivery date, April 15, 1937.

2 bulk lake freighters 610'x60'x32'6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Delivery date April 15, 1938.

DRYDOCK AND ROUTINE REPAIRS: **J. P. Morgan, Wm. E. Corey, H. C. Frick, C. S. Robinson, Joseph Sellwood, J. S. Ashley, E. T. Weir, H. R. Jones.**

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis and DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 172, "J" class sloop for Mr. Harold S. Vanderbilt; delivery spring, 1937.

Hull No. 173, Winchester, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, May 15, 1937.

Hull No. 174, single screw, diesel propelled trawler for Boston Mass., owners; estimated delivery, June 1, 1937.

Hull No. 175, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 176, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION: **Heavy Cruis-DD-380, Gridley, 1500 Ton Destroyer.** Keel laid June 3, 1935; launched December 1, 1936; estimated delivery, May, 1937.

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; launched February 25, 1937; estimated delivery, June, 1937.

CV7, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; estimated delivery February 1, 1938.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil Tankers**—steam—425'x64'x34' for Gulf Refining Co.; total tonnage 7070 each.

Two 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots. Total cost for both vessels will be $4,000,000.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel towboats** of 550 H. P. each, for private parties. Delivery dates May 1, 1937, and June 1, 1937.

One 90' all-welded diesel tug for the Red Star Towing Co.; delivery date, May 1, 1937. 750 horsepower.

One all welded steel oil barge for the Barrett Co.; 97'x25'x10'; estimated delivery date June 1937.

DRYDOCK AND ROUTINE REPAIRS: Overhauling tank barge fleet of Hygrade Corp. Overhauling fleet of diesel tugs of United Petroleum Transportation Corp.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Furnishing hoppers and cars for Etiwan Fertilizer Company.**

DRYDOCK AND ROUTINE REPAIRS: **U.S.L.H. tender Palmetto, yacht Peg-N'-Doby, yacht Berto, yacht Mary Otis, U.S. Quartermaster steamer Sprigg Carroll.**

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

NEW CONSTRUCTION: One 73' cruiser, 2 Speedways. Delivery date, June 1, 1937.

One 42' playboat, 2 Kermaths, delivery date, May 15, 1937.

One 42' play boat, 2 Kermaths, delivery date, June 1, 1937.

One 39' play boat, 2 Buda diesels. **Delivery date April 1, 1937.**

One 20' yacht tender, 2 Kermaths, delivery date, May 1, 1937.

Three 39' play boats (stock).

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION: **One 175'x34' x10' tender for U.S. Lighthouse Dept.** Two triple expansion steam engines; total horsepower 1000; keel laid July 1, 1936; estimated delivery, April 1, 1937.

One lighthouse tender, Elm, 72' 4" x 17' 0" x 6' 6", for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997**, one diesel sternwheel towboat of 91 gross tons.

Hulls Nos. 1298-1299, inclusive; two self-propelled diesel pipe line dredges, Thompson and Rock Island, for U.S. Engineers, St. Paul; 3974 gross tons.

Hulls Nos. 1324-1327, inclusive; four welded flush deck cargo box barges 100' x 26' x 6'6"; 660 gross tons.

Hulls Nos. 1354-1361, inclusive: eight welded type W-3 coal barges 175' x 26' x 10'8"; 3776 gross tons.

Hulls Nos. 1363-1368, inclusive; six welded steel oil barges 175' x 26' x 10'8"; 2832 gross tons.

Hulls Nos. 1369-1374, inclusive; six welded flush deck cargo box barges 130' x 34' x 10', for Warner Equipment Co., Philadelphia, Penn.; 2712 gross tons.

Hulls Nos. 1375-1378, inclusive, and 1384, five welded steel deck barges 80' x 30' x 9', for Pennsylvania Railroad, Phildelphia, Penn.; 885 gross tons.

Hulls Nos. 1379-1383, inclusive: five type W-3 welded coal barges 175' x 26' x 10' 8"; 2360 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; 320 gross tons.

Hull 1387; one riveted steel coal barge 170' 2" x 40' 2" x 17', for Oliver Transportation Co., Philadelphia, Pa.; 1100 gross tons.

Hulls Nos. 1388-1412, inclusive; 25 welded steel coal barges 140' x 26' x 10', for Wheeling Steel Corp., Wheeling, West Va.; 8875 gross tons.

This makes a total of 65 hulls with a total gross tonnage of 27,585 tons.

ELECTRIC BOAT CO.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936.

Hull No. 28, Skipjack, SS184, stand-

ard displacement, 1450 tons; keel laid July 22, 1936.

Hull No. 29, Sargo (SS188); estimated keel laying date, April, 1937.

Hull No. 30, Saury (SS189); estimated keel laying date June, 1937.

Hull No. 31, Spearfish (SS190); estimated keel laying date August, 1937.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; keels laid June 27, 1935 and October 10, 1935, respectively; estimated launching, March 13, 1937, and May, 1937, respectively.

Three destroyers, DD397 Benham, DD398 Ellet and DD399 Lang, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936 and DD398, December 3, 1936.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing; keel laid, Hull 143, Decemer 16, 1936; Hull 144, February 8, 1937.

Two destroyers, DD411 and DD412.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

Three 1000-ton all welded steel deck barges for sand and gravel movements; length 130', breadth 34', depth 10'. To be built at Chickasaw (Mobile), Alabama, for Warner Company, Philadelphia. Delivery April 15, 1937.

One steel cargo barge, 140' x 45' x 10'. To be built at Chickasaw, Alabama, for Valley Barge Line, Tuscaloosa, Ala. Estimated launching date, April 1, 1937; delivery date, April 15, 1937.

Four hopper type barges, 132' x 30' x 7' 9"; estimated launching dates, April 20, 28, and 30, 1937; delivery date, May 10, 1937.

Eight steel cargo barges, stock type, 132' x 30' x 7'9", for carrying petroleum products in hull or for heavy deck loading, for John I. Hay Co., Inc., Chicago, Ill. To be built at Decatur, Alabama yard. Estimated launching dates: March 27, March 30; April 24, 26, 28, 30. Delivery dates: April 10 for 2; May 10 for remaining four.

One 50' steel barge; two 60' steel barges, U. S. Engineer Office, Savannah, Georgia. 50' x 18' x 4'; 60' x 22' x 4'. Tentative launching date, April 3; Delivery date, approximately May 10.

JAKOBSON & PETERSON, INC.
Foot of 16th Avenue
Brooklyn, N. Y.

NEW CONSTRUCTION:

Four station barges for the Gulf Oil Co.; 45' x 25' x 6'6". To be used for dispensing Gulf products at important yacht harbors. Delivery dates, 2 on April 15, two on April 30, 1937.

Two bulk oil delivery boats for Gulf Oil Co.; 55' x 13'6" x 6'; powered with 75 H.P. Superior diesels. Delivery dates, 1 on April 15, 1 on April 30, 1937.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION: One full model hull, all-welded diesel tug, 55' long, 14' beam, 7'6" deep; 120-horsepower Fairbanks-Morse marine diesel engine; for Atlantic, Gulf & Pacific Co., New York City.

One all-welded, steel derrick barge 50' x 28' x 5'3", for Austin Bridge Co., Dallas, Texas.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: One single screw, electrically welded, steel oil tank steamer, 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated launching date, July 15, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION: Opon, sternwheel river steamer, 200' x 44' x 5'6"; keel laid November 6, 1936; launched January 25, 1937.

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. Keel laid December 9, 1936.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: Five steel carfloats, 250'x34'x9', for the Pennsylvania Railroad, to be delivered in April, May and June, 1937.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: H 359 aircraft carrier CV5, Yorktown, for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6".

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launching date, August 1, 1937; delivery date, September, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280' x 48'6" x 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

DRYDOCK AND ROUTINE REPAIRS: Rebuild Scow 8 for City of Baltimore; Tugs Wrestler, America, Britannia, M. Mitchell Davis.

SUN SHIPBUILDING AND DRYDOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, 1 oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, steam tankers for Standard Oil Company of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, August, 1937; delivery date, September, 1937. No. 162, launching date, January, 1938; delivery date, February, 1938.

Hulls No. 163, 164, and 165, three diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launching date, July, 1937; delivery date August, 1937. No. 164, keel laid December 15, 1936; launching date, January, 1938; delivery date, February, 1938. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T.

TAMPA SHIPBUILDING & ENGINEERING CO.
P. O. Box 1838
Tampa, Florida

DRYDOCK AND ROUTINE REPAIRS: Chippewa, Syros, Transford.

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION: 24 pontoons 48' x 16' x 2'6" for U.S. Engineer, St. Paul, Minn.

1 steel flat 54'0" x 18'0" x 3'0", for Duquesne Light Co., Pittsburgh, Pa.

1 derrick barge 100' x 44' x 6' for U. S. Engineer Office, Vicksburg, Miss.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD384, U.S.S. Dunlap, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched April 18, 1936; estimated delivery, April 30, 1937.

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, June 30, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching June 10, July 2, and July 29, 1937, respectively; estimated delivery, August 3, August 24, and September 14, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250', Beam 43'6", Depth 16'. Estimated keel laying, April 27, May 11, and June 8, 1937, respectively; estimated launching, August 17, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

Hull No. 849, ferryboat John J. Walsh, for the Westchester Ferry Corp., Yonkers, N. Y. LOA 153', beam, extreme, 48', depth 14'6". Estimated keel laying, April 27, 1937; estimated launching, June 22, 1937; estimated delivery, July 27, 1937.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6". Estimated delivery, July 26, 1937.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, July, 1937 and August, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19'8"; estimated delivery, June and August, 1938.

Order placed for **DD415, O'Brien,** and **DD416, Walke,** two destroyers; delivery dates, August, 1939, and October, 1939, respectively.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn,** light cruiser, L.B. P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu,** light cruiser; L.B. P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935. Estimated launching indefinite; estimated delivery, May 1, 1938.

CL 50, **Helena,** light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

DRYDOCK AND ROUTINE REPAIRS: Erie arrived December 30, 1936, for docking, preparation for final trials, and completion of uncompleted work. Mahan arrived Jan. 15, 1937, for preparation, final trials, and completion of work. Reid arrived March 1 for preparation, final trials, and completion of work.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION: **One Coast Guard Cutter;** LBP 308', LOA 327',

Fairbanks, Morse engined motor tug Challenge

breadth, molded, 41', draft 12'6", displacement 2000 tons. Keel laid August 15, 1935; launched January 14, 1937; estimated completion, April 15, 1937.

Order placed for DD407 and DD418, two 1500 ton destroyers; no dates set.

Order placed for one harbor tug approximately 130 feet long.

UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9 ¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404**, 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION: **SS180 Pollack**, keel laid October 1, 1935; L.B.P. 292'6", beam 25', loaded draft 15'; launched September 15, 1936; estimated delivery May, 1937.

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion March 1, 1938; **SS186 Stingray**, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

SS192, Squalus, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

Marine Inspection Appointments

Recent announcement of the appointment of **Captain Halbert C. Shepheard** as assistant director of the Bureau of Marine Inspection and Navigation was made by Secretary of Commerce Roper. Captain Shepheard succeeds **General Dickerson N. Hoover**, who resigned this post over a year ago. The former entered the old Steamboat Inspection Service in 1924, since that time serving as assistant, local, and traveling inspector in various districts. He joined the staff of the bureau at Washington in 1928, and has been acting assistant director there for the past year and a half.

Owing to the prolonged illness of **Captain Oscar G. Haines**, who had been in charge of the U. S. Bureau of Marine Inspection and Navigation for many years, **Earl B. Hull** has taken over the post of Supervising Inspector at Boston. Hull has been associated with the Bureau for over twenty-one years, entering the service when it was known as the Steamboat Inspection Service. Until his present appointment he was traveling inspector for the department, previously being an engineer.

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

B. B. Blake

B. B. Blake Appointed Manager Westinghouse, Seattle

W. R. Marshall, vice-president of the Westinghouse Electric and Manufacturing Company, recently announced that **B. B. Blake** had been appointed manager of the company's Seattle office. Blake was born in Winona, Minn., in 1898, but moved to Seattle at an early age. He received both grade and high school education in Seattle, and was graduated at the University of Washington as a mechanical engineer with the class of 1920.

Upon finishing school, he went with Westinghouse as a graduate apprentice at the East Pittsburgh and South Philadelphia Works, in 1921 joining the sales engineering force of the Seattle office, and up to the present time has been mainly concerned with steam engineering and marine sales.

W. D. McDonald, who has been manager of the Seattle office since 1914, has received the appointment of assistant to vice-president.

Matson Directorate

At the annual meeting of the stockholders of Matson Navigation Company on March 4 five new directors were chosen for the board, two to fill vacancies created by retirements, and three being new additions, thus giving the company twelve directors. Matson, therefore, has one of the strongest directorates that guide the operations of any steamship company in America.

William P. Roth was re-elected president, as were the other officers, including vice president **A. C. Diericx**, who will remain an officer, though retiring from active duties of the board.

The new directors are: **R. A. Cooke**, president of C. Brewer & Co., Honolulu; **A. G. Budge**, president, Castle & Cooke, Ltd., Honolulu; **J. W. Speyer**, San Francisco manager, Alexander & Baldwin, Ltd.; **Starr Bruce**, president, Welch & Co., and **Harry Chandler**, of Los Angeles.

Cooke and Budge were chosen to fill the vacancies created by the retirement of **E. F. Bishop** and **A. C. Diericx** from the board, whereas the remaining three constitute new additions to that body. Other members of the board are: **W. M. Alexander, F A. Bailey, W. W. Crocker, Geo. G. Montgomery, W. P. Roth,** and **A. P. Welch**, of San Francisco; and **H. A. Walker** of Honolulu.

N. Y. S. A.

A. J. McCarthy, vice president of the International Mercantile Marine Company, was recently elected chairman of the New York Shipping Association for the ensuing year. **Christian J. Beck**, of North German Lloyd, was elected vice chairman, and **Joseph Mayber**, secretary.

H. G. Rethmeyer

H. G. Rethmeyer New Marine Representative for Westinghouse, Seattle

H. G. Rethmeyer has recently been transferred by Westinghouse from San Francisco to their Seattle transportation division. He was graduated from Kansas State University in 1926 with the degree of Bachelor of Science in electrical engineering, and was selected by Westinghouse to enroll in their graduate student training course. This took him to several of their main manufacturing plants. Upon completing the training course, he was assigned to various transportation activities, including the marine sales engineering department.

In 1930 Rethmeyer was transferred to the traction and marine division of the San Francisco office. His activities during the past seven years in San Francisco were devoted principally to marine work. Although he has been transferred to the Seattle office, he will continue in the marine field, for which his previous training and experience have well qualified him.

Personals

The appointment of **Bernard J. Hanley** as district freight agent for McCormick Steamship Company in New York, has been announced by **James H. Condon**, general freight agent for the company. Hanley's headquarters will be at 17 Battery Place.

Max Rosenbach, former superintendent of Marx Brothers store in San Francisco, died in that city in the early part of March. He was always active in Western traffic conferences and in the work of the Central California Traffic Association. Mr. Rosenbach passed away at a little over sixty years of age, and had always been a favorite with rail and ship transportation men.

Word of the death of **Werner Schramm**, an official of the North German Lloyd, was received by **Mr. Blatt**, Pacific Coast manager of the company. Schramm passed away unexpectedly in Bremen early in March. He had been in charge of all freight traffic for the line, and was not yet fifty years of age.

Fred T. Adams, for many years connected with the Pacific Steamship Company in the freight department, has gone with Hammond Shipping Company as assistant traffic manager. Hammond has moved back to Pier 20 as its local terminal.

The re-election of **A. B. Johnson, Jr.**, of the Johnson Lumber Company, as chairman of the Pacific Coastwise Lumber Conference, took place recently. At the same time, **Raymond F. Burley**, of the McCormick Steamship Company, was elected vice chairman, succeeding **Charles A. Perkes**, of Pacific Steamship Lines.

Captain Joseph Meany, who has been on duty at the local office of the Bureau of Marine Inspection and Navigation at Los Angeles Harbor for the past year, has been appointed chief of the hulls section, and has already taken up his duties. He succeeds **Captain S. A. Kennedy**, inspector of hulls at Los Angeles since 1918, the latter having been transferred to San Francisco.

DRAWN BY NED HILTON

"I Want a Foghorn That Goes Whoo-EEE-WAH"

When the California arrived in San Francisco on her last run she had a new commander, **Captain John F. Jensen**, who was given the post temporarily. He was once commander of the President Roosevelt.

Captain Jensen replaces **Captain Robert A. Smith**, the latter having been transferred to the Roosevelt to succeed **Captain William B. Oakley**, who takes command of the California on her next westward voyage. Captain Smith will command the Roosevelt in the transatlantic service to, Cobh, Plymouth, Havre, and Hamburg. He has been with I. M. M. since 1919, when he went on the Philadelphia (of the old American Line) as second officer, in 1923 becoming chief officer of the Kroonland, Panama Pacific Line ship. He has been associated with the intercoastal service since that time, and was promoted captain with his appointment to the command of the California in July, 1932.

Captain Oakley, since September, 1936, commander of the Roosevelt, ran coal to Panama in 1915 as commander of the Advance, during the construction days of the canal. Since he went with United States Lines in 1922 he has served as chief officer of the America, George Washington, and Leviathan, and as commander of the American Shipper, American Farmer, American Banker, and President Roosevelt.

NEW PAINT PLANT AT SAN LEANDRO

The Inter-Coastal Paint Corporation, with plants located at East St. Louis, Illinois, and Baltimore, Maryland, have just completed a modern paint and varnish plant in San Leandro, California, in order to better serve the Pacific Coast trade, and are specializing in a complete line of paints and varnishes for the shipping industry. This company are the originators and sole manufacturers of "Consol," both plain and in colors, this product being a conditioning solution for metal surfaces that have become corroded.

J. I. Nairne, who was formerly located on the Pacific Coast, is Inter-Coastal's general manager, in charge of the Pacific Coast Division.

Propeller Club of California Holds March Meets

Ernest E. Johnson, prominently mentioned as the Pacific Coast's candidate for the U.S. Maritime Commission, was introduced to the Propeller Club of California at the March 9 luncheon meeting.

Mr. Johnson responded to chairman Le Count's remarks by giving a condensed outline of America's merchant marine problems, comparing the nation with a huge department store handicapped in delivering its own goods. Ships must be subsidized, said the speaker, to place them on a parity with their nearest competitor. Of the ship-operating dollar, 80 cents is an out-and-out labor cost. Basic comparisons of the labor cost indicate $0.748 per hour for the U. S., as against $0.31 in England, $0.173 in Italy, and $0.05 in Japan, with the last mentioned country on a 65 hour per week basis. "An 8 million dollar liner, such as our newest Coast ships," stated Johnson, "could be built in Europe for 5 millions—in Japan for 3 millions."

C. M. "Dad" Le Count elevated to vice-presidency

● **Vice-President Selected**

President Edward Harms introduced newly chosen vice president C. M. Le Count, who took over the gavel as chairman of the day.

Guest speaker Frank H. Beckman gave his audience a rapid-fire account of his journeyings through India. The subject was fascinating, and prolonged applause was substantial evidence of the way his hearers felt about speaker Beckman's remarks.

● **Harbor Engineer Addresses Club**

Frank White, chief engineer of the Board of Harbor Commissioners, will address the club at the Tuesday, March 23, meeting. This promises to be a banner day. Joseph A. Moore, Jr., is serving as chairman of the day.

New Committees

Committees for 1937 as appointed by President Harms are:

Entertainment: Bryant O'Conner, Chairman; Jerry Lalor, Howard Oxsen, Dick Glissman, Ben McFeeley, Bern DeRochie, Hugh Brown, P. M. Paulsen, Jack Presser, E. A. Williams.

Finance: C. E. Finney, Chairman; George E. Swett, Erik Krag.

Auditing: Fletcher Monson, Chairman; John Parker, N. O. Gunderson.

Membership: Paul Faulkner, Chairman; John Bolger, James Rolph, III., Jim Vizzard, Henry Barbieri, Charles Lowe, Abe Marks, Les Kerdel.

Golf: Syd Livingston, Chairman; Arthur Donnelly, Vernon Showell, Russell Haviside, Julian Arntz, Edw. Egbert, Vincent Morabito.

Legislative: L. L. Westling, Chairman; David Dickie, Charles Rogan, J. Gisler, J. A. Thomson, S. E. Allen.

Navy: Walter J. Walsh, Chairman; Commodore Geo. Bauer, Henry Gelhaus.

Schoolship: Capt. Dave Castle, Chairman; Dr. A. A. O'Neill, Capt. L. M. Edelman. Jos. P. Dolan, Edwin Forrest, P. N. Harding.

Capt. John Moreno New Pilot Commissioner

Recently appointed by Governor Frank H. Merriam, Captain John G Moreno is one of the three men on the San Francisco Bar Pilot Commission, succeeding Captain Francis Edwards, who recently passed away.

Captain Moreno has lived in San Francisco for many years, beginning his career on the West Coast in 1914 as commander of a United States Army dredge on the Columbia River. Two years later he went East to bring out the dredge San Pablo, after which he saw service in the Navy during the World War. He then joined Panama Mail as commander, later going with Dollar Line, from which he retired as master of the President Taft several years ago.

Captain Jack Kane and James Rolph III are the two other members of the Bar Pilot Commission.

McCormick Zoo

When the S.S. West Ivis of the Pacific Argentine Brazil fleet of the McCormick Steamship Company departed for the East Coast of South America recently, she had on board a real live menagerie. Enclosed in strong wooden crates for safe keeping were two elk and two buffaloes from Yellowstone National Park, destination, the zoo at Buenos Aires. The Argentine Embassy at Washington made arrangements for forwarding to the Director of Zoological Gardens at Buenos Aires.

The overland trip was made via express in a baggage car.

New Packing Firm Announced

Val Savage Heads Up Engineering Sales Service

Val Savage.

Here's "scoop" news for P.M.R. readers! Val Savage, one of the most popular marine men on the Atlantic seaboard, has just entered the packing business.

Val Savage is launching the new enterprise under his own banner, and the new firm name is Savage Packing and Engineering Company. Headquarters have been established in New York City and branch offices will be opened immediately along the Atlantic Coast and in the Gulf and Pacific maritime districts just as fast as competent sales engineers are secured and trained.

Savage Packing and Engineering Company will carry a complete line of metallic and fabric packings, including metallic condenser tube packing.

Val Savage has an excellent marine background . . . as many of the ship operating personnel know. Both Navy and Merchant Marine have occupied his activities and his engineering training has been exceptional with the exacting duties of the Navy as the foundation for years of varied duties in shore-side work.

In interviewing Val on his new enterprise, we ferreted out the following details:

He enlisted in the United States Navy in 1908, Engineering Department, served through the various grades and was commissioned. He was Chief Engineer of the U.S.S. Wainwright, one of the original six destroyers to go to Queenstown during the World War and served continuously until the end of the war, when he was made Chief Engineer of ships at the U.S. Naval Academy. Later he was Engineer Repair Officer for the 9th Squadron Destroyers, which included nineteen destroyers, one cruiser and repair ship.

He resigned from the United States Navy and became Supervisor of Repairs, both deck and engineering, at Fletcher's Drydock until they merged with the United. For the next three years, he supervised repairs, both deck and engineering, for the Eureka Marine Company. For the past five years, he has had charge in the New York area of marine sales and service for one of the leading packing concerns, namely, Crane Packing Company.

During his first years in the Navy, Val was the proud defender of the lightweight belt. We venture to say many of his friends do not know of his "leather-pushing" record . . . nor of his football triumphs. Yes, sir! Val was the official signal caller on the famous Pennsylvania team . . . a quarter-backing general in the days when the boys were plenty rough.

And here is another characteristic slant: for two years he was French interpreter in the service at Constantinople, swapping "parley vous" with the best of them.

Val still finds time to indulge his hobbies, despite his business activities which have made him one of the big city's best "gang-plank climbers." For example: He is a past president of the Hoboken Lions Club . . . an active worker with the New York Propeller Club . . . a golfer who thinks nothing of breaking 120 (which isn't bad business at 25 cents per hole—if you select your opponents with a surveyor's eye!)

Val belongs to golf clubs we can't even pronounce . . . Yountakah Country Club, f'rinstance! And at the Forsgate Country Club, where he also pays dues, you'll find him most any Sunday playing his consistent, steady, non-erratic game . . . breaking 120's all over the lot.

It's a great business which Val Savage and his associates are launching. They know their product is right and they have what it takes to render intelligent engineering service to the American ship operator. Pacific Marine Review joins with his many friends in wishing Val well in his new venture. Leadership of a man of his character, personality, and training spells success.

Bilge Club "Ruckus"

Looks like big doings down San Pedro way! We've just received this enticing announcement:

"The Ninth Annual
BILGE CLUB BANQUET
San Pedro, California

Will be launched on the sea of Good Fellowship, which is always kept calm and peaceful at this harbor by the Fraternity and Confidence of the Bilge Club membership.

The Place
Biltmore Hotel, Los Angeles

The Date
Saturday Evening, April 3, 1937

The Time
Seven Bells (7:30 p.m.)
(Bar pilots available at 6:30 p.m.)

Having proven to the satisfaction of the examining board that you have recognized capabilities in some capacity which goes to make the aggregate of marine activities in our port, and being known never to falter at any undertaking to which you have been assigned, you are hereby commanded to report at the time and place above specified.

Kindly fill out the enclosed application for reservations immediately and return with check payable to J. J. Buntin, Secretary, Box 98, Terminal Island, California.

Admission: $5.00 Formal
Reservations Closed March 31, 1937"

I. M. M. Appoints Victor Freeze

Victor J. Freeze has been appointed general freight traffic manager of the International Mercantile Marine Company, announces Basil Harris, vice president of the company. The appointment was made to fill the vacancy left by the death of Frank A. Ryan on February 23.

Freeze has been in the shipping business since 1918, when he joined the freight department of Furness, Withy & Co. in Baltimore, his native city, and was assistant freight traffice manager under Ryan from August last till the time of the latter's death. He was Baltimore traffic manager for the United States Shipping Board for two years, being transferred in 1922 to Washington to direct operation of Shipping Board vessels in the long voyage trades from Atlantic, Gulf, and Pacific ports. He came to New York in 1924 to take over the duties of traffic manager of all United States Shipping Board services out of North Atlantic ports, leaving the post in 1927 to become traffic manager of the Roosevelt Steamship Company. When the company merged with I. M. M. in 1931, Freeze continued as traffic manager of all the American Pioneer Line's cargo and passenger services to India, Australia, and the Far East.

He will direct all the freight operations of United States Lines, Panama Pacific Line, and American Pioneer Line, as general freight traffic manager for I. M. M.

J. A. Dwyer Appointed Crane District Manager

On March 1, 1937, J. A. Dwyer, manager of the Philadelphia branch of Crane Co. becomes district manager of all Crane branches in the Eastern territory, including all of the New England states, in addition to metropolitan New York, Eastern Pennsylvania, New Jersey, Maryland, and the District of Columbia. A total of eighteen Crane establishments thus come under the jurisdiction of Mr. Dwyer, whose headquarters will be at the company's New York branch.

H. S. Officer, manager of the Newark branch, succeeds Mr. Dwyer at Philadelphia, and J. H. Geiss moves from Hempstead, Long Island, to succeed Mr. Officer as manager at Newark.

Pacific Paint & Varnish Co.

Synthex Red Lead Primer (Q. D.)
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" Anti-Fouling
" White Enamel-Non-Bilge (O.S. & I.S.)
" Cabin Enamels (Q. D.)
" Mast Colors, Hull Black
" Boottopping, etc.

Synthex Marine Spar Varnishes and Yacht White Enamel

Aluminum Enamel

Flat White (Inside & Outside)

A specialized finish for each paintable surface.

Pacific Marine Finishes have been used successfully for years by most of the important steamship companies. Each represents a specially developed product for a specific purpose. Quality—not price—is the objective of our Research Department.

L. M. DuCOMMUN, President — San Francisco and Berkeley — A. B. ROBERTSON, Vice President

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1. **Pacific Coastwise Service.** Twice a week McCormick has regular and frequent sailings between Washington, Oregon, and California.

2. **Pacific-North Atlantic Service.** Weekly sailings are provided from Albany, Brooklyn, Philadelphia, Baltimore, and Norfolk to all Pacific Coast ports. Eastbound sailings are on a ten-day frequency.

3. **Pacific-West Indies Service.** Fortnightly sailings are available from Pacific Coast ports direct to San Juan, Ponce, and Mayaguez, Puerto Rico, as well as to other West Indies ports by transshipment at San Juan.

4. **Pacific-Argentine-Brazil Line.** (U. S. Mail Steamers—Passenger Accommodations.) Sailings fortnightly between Pacific Coast ports and the East Coast of South America, including Port of Spain, Rio de Janeiro, Santos, Buenos Aires, and Montevideo. Perishable cargoes are protected in McCormick's refrigerated vessels.

These frequent sailings plus superior McCormick terminal facilities and McCormick-trained men offer you speed in the handling of your important cargoes.

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Texaco Official Visits Coast

J. G. Van Santwood, Manager of Marine Sales for the United States for the Texas Company, was a recent visitor to the Pacific Coast, where he spent some very active days with Fred J. Cordall, territorial marine representative of the Texas organization.

While in the San Francisco district, Mr. Van Santwood was particularly impressed with the yacht harbors around San Francisco Bay. His inspection tour included the various small boat areas . . . Monterey, Santa Cruz, the Bay yacht harbors, and as far north as Pittsburg, Calif.

Fred Cordall made a competent guide. The Texas Company is particularly interested in this classification of the marine market and maintains bunkering facilities in all of these districts for pleasure craft and commercial boats. One of the valuable services the company is rendering is the issuing of cruising charts of Bay and inland water localities. These charts are available to boat operators through Mr. Cordall's office with the Texas Company in San Francisco.

Mr. Van Santwood included a thorough inspection of the Los Angeles harbor and Southern California maritime districts before returning to his headquarters in New York.

New **Terminal Official.** Eugene L. Harold, formerly of Seattle, has been elected secretary and treasurer of the chain of Tidewater Terminals, with headquarters in Philadelphia. This chain consists of Norfolk Tidewater Terminals, Inc., in Norfolk, Va.; Newark Tidewater Terminal, Inc., at Newark, N. J.; Lincoln Tidewater Terminals, Inc., in New York, N.Y.; and Boston Tidewater Terminal, Inc., in Boston, Mass.

For several years Mr. Harold was engaged in the insurance business in Texas, and returned to the West Coast to join his father, who is Pacific Northwest manager of the Fire Companies Adjustment Bureau and well known among shipping, lumber, and canning industries. Later he was for many years associated with motor truck transportation concerns operating in the East.

The chain of Tidewater Terminals is now headed by Walter B. McKinney, since the death of its former president, Harvey C. Miller.

New **Grace Appointment.** Captain William C. Renaut has been appointed as assistant port captain and relieving master for the Grace Line at New York.

Captain Nilsen, who is regularly in command of the Santa Lucia, was off on vacation during the last two voyages and Captain Renaut was master. During his first two weeks ashore Captain Renaut will relieve Captain Thomas Blau, Grace Line port captain, who is planning a busman's holiday. He is going to Florida by boat.

On Captain Blau's return, Captain Renaut will assist him in the multiple duties connected with the Grace Line fleet and the three North River piers. He also will relieve other masters for vacations.

Nickel Steel Specified for Ship's Hull Rivets

In view of the acceptance by the American Bureau of Shipping, and by Lloyds' Register, of low carbon $1\frac{1}{2}$ per cent nickel steel specifications for rivets used in ship hulls, a discussion of the qualities of this steel which render it suitable for this application should be of interest.

Rivets of S.A.E. steel 2115 possess especial advantages for use in ship hull construction. Their advantages, compared with rivets of carbon steel and higher alloyed steels, may be listed as follows: Physical properties superior to carbon steel with similar driving properties; absence of excessive scaling; corrosion-resistance superior to that possessed by carbon steel; and excellent working properties.

The following minimum requirements have been set for bars from which rivets of this material are to be formed in Recommended Railroad Specification No. 9 of The International Nickel Company, covering "High Strength Rivets."

	Size Up to 1"	Size 1"-2"
	Min.	Min.
Tensile Strength, lbs./sq. in.	65,000	60,000
Yield Point	45,000	40,000
Elongation (in 2")	28%	25%
Reduction of Area	55%	50%

A more usual set of requirements for rivet materials is as follows:

Ultimate Strength	55-65,000 lbs./sq. in
Yield Point	50 per cent of ultimate
Elongation in 8"	1,500,000/ultimate

Bend tests were carried out in which the ¾", ⅞" and 1" rods were bent cold on themselves without failure or cracking. These bend tests were then repeated, using rods ¾", ⅞" and 1" which had been heated to 1650 deg. F. and air cooled. In these tests also no failures or cracking occurred.

To further investigate the possibility that a temper brittleness could be induced in this material, bars of ¾", ⅞" and 1" were heated to a dull red (estimated 1,000 deg. F.) and quenched in water. They were then bent 180 deg. flat on themselves with no failures and no signs of cracks.

Six inch rivets were formed from ¾", ⅞" and 1" rods and the shanks bent cold 180 deg. flat on themselves with no failure or signs of cracks. A second set of these rivets was heated to 1650 deg. F., cooled in air and then the shanks were bent cold 180 deg. flat on themselves with the same good results.

Hot driving tests were conducted, in which it was specified that the heads of the rivets should be increased two and one half times the shank diameter. The actual increase obtained was greater than two and one half times, yet no failures occurred.

Shearing tests of riveted joints, made by the Ameri-

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Nickel Steel Rivets

(Continued from Page 57)

can Locomotive Company, show that the shearing strength of the nickel steel rivets is about 40/50 per cent higher than that of the customary carbon steel rivets, calculated on the nominal cross-sectional area of the rivets.

● Driving Properties.

Rivets of S.A.E. 2115 can be handled, heated and driven in the identical manner used for carbon steel rivets. To test this, rivets of S.A.E. 2115 steel were mixed with carbon steel rivets and the practical riveters did not detect any difference.

● Corrosion Resistance.

The corrosion of the countersunk heads of rivets in tankers first suggested that rivets of S.A.E. 2115 would be an advantage in ship construction. Apparently the countersunk head of carbon steel rivets is less "noble" than the ship plate, so that there is an accelerated attack upon the head. The S.A.E. 2115 steel is more "noble" than ship plate, so that corrosion is turned from the rivet to the plate when the two are in conjunction, yet the potential is not sufficiently high to cause appreciable accelerated corrosion of the plate. The ratio of plate area to rivet area is so great as to further minimize any harmful effects of the difference in potential upon the plate.

A study of the effects of nickel steel plate and rivets in contact with carbon steel plate has been carried out at the Research Laboratories of The International Nickel Company, by measuring the potential of two steel ship plates at the end of five days exposure to aerated 3 per cent sodium chloride solution, using a saturated calomel half cell as reference electrode. The results were as follows:

Plain Steel	0.704 volts
2.16 per cent Nickel Steel	0.614 volts
Difference	0.09 volts,

plain steel being anodic to the nickel steel. This difference in potential, although very small, was always in such a direction as to favor longer life of nickel steel used as rivets in comparison with carbon steel rivets.

A more nearly practical test was run by exposing a portion of a ship plate totally submerged in the brackish water of Kill van Kull at Bayonne, N.J. This plate carried two plain rivets and two nickel steel rivets (1.9 per cent nickel) which were threaded at the end so that they could be bolted to the plate and removed for weighing. The plate and rivets had been cleaned of all scale and paint before exposure. The results of the weight loss measurements were as follows:

Rivet Material	Average Loss in Wt. mg./sq.dm./day	Penetration Ins./year
Carbon Steel rivets	54	0.010
2 per cent Nickel rivets	21	0.004

(Duration of test, 177 days)

In examining the plate and rivets at the end of the test no evidence of accelerated corrosion due to galvanic action was detected.

Once More . . .
Let's Kill The Pettengill Bill

House Resolution 1668 (the Pettengill Bill), which would, if enacted into law, repeal the long and short haul clause of the Transportation Act, is up again for consideration in the House of Representatives. A recent meeting of Congressmen opposed to this measure appointed a steering committee of seven to manage the opposition on the floor of Congress. This committee was composed of: Congressmen Walter M. Pierce, Oregon, chairman; John Rankin, Mississippi; Francis Culkin, New York; D. Worth Clark, Idaho; Jerry J. O'Connell, Montana; Henry C. Luckey, Nebraska; and Clifford Hope, Kansas.

This committee prepared and issued a statement on the Pettengill Bill, together with a summary of certain testimony thereon. The following is abstracted from this document. The subheads are our own.

● The Bill Is Discriminatory

It should be made clear that this bill appears to be the answer of the Wall Street owners of railway stocks and bonds to the development of waterways and motor trucking. It has, apparently, resulted from determination to prevent the benefits of progress in transportation from accruing to producers, who are now feeling some relief on account of competition of trucks and waterways.

Opponents are convinced that this bill, if enacted into law, would open the way for further discrimination against the inland farmers, merchants, and shippers, who bear, equally with others, the costs of State and National Governments.

It is opposed by most of the interior country, it is opposed by the beneficiaries of our great waterways program, it is opposed by whose who live at tidewater and are dependent upon the protection of water-borne traffic.

It is favored and promoted by a certain geographical section which seeks unfair advantage, and, most strangely, by most railway laborers who have been misled into the belief that this legislation would result in increased employment and wages.

● History Of Legislation

A half century ago the Congress of the United States enacted a law creating the Interstate Commerce Commission. That law resulted from the demands of farmers, shippers, and merchants who were in open rebellion against the injustice of railway rates, an injustice similar to that proposed under the pending legislation. The original act has been amended several times, always to strengthen the long-and-short-haul clause of the Transportation Act.

Whether transportation lines should have a right to charge more for a short haul than for a long haul, over the same lines going in the same direction, has been a mooted question ever since the railroads came into ex-

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Pettengill Bill

(Continued from Page 60)

istence. In 1920 the present fourth section of the Transportation Act was passed by the Congress. The great Rocky Mountain interior had suffered more severely from unjust railroad tariffs prior to 1920 than any other part of the United States. Rates for eastward shipments of wool and wheat were often much higher from the mountain region of the western half of the United States than were the rates for a point many hundreds of miles farther west. On the other hand, traffic rates for products of eastern industries used in that great intermountain region were far higher than they were for terminals on the Pacific Coast. In other words, non-competitive points were obliged to pay the through-traffic rates from coast to coast and then the so-called back haul, which was often more than the entire haul across the continent.

This unjust situation was changed to some extent 17 years ago, when the fourth section of the Transportation Act was enacted. The Interstate Commerce Commission was given the power to grant fourth section relief to transportation lines upon proper showing. That relief has been granted in many cases and denied in very few. When denied, the Interstate Commerce Commission has had convincing reasons.

●The Pettengill Bill

One year ago a bill was introduced into Congress known as the Pettengill bill. It passed the House, not on its merits but on account of propaganda for its enactment put out by the railroad companies. A potent factor in its success in the House was the support of railway labor, based on a mistaken assumption that they were to have the cooperation of railway management to better their condition. The bill died in the Senate in committee. Practically the same bill is again before us. Extensive hearings have been held before the House Committee on Interstate and Foreign Commerce.

The enactment of H. R. 1668, modifying the fourth section of the Transportation Act, is opposed by those geographical sections and producing groups, heretofore mentioned, which would undoubtedly be penalized by heavier freight rates, as well as by water carriers, motor vehicles, and the beneficiaries of those modes of transportation.

●Arguments Pro and Con

Those in favor of the bill claim that its passage will enable the railroads to compete more freely with other forms of transportation and add largely to their revenue and to the increase of wages for their employees. The proponents also claim that the net earnings can be increased by taking all traffic at so-called out-of-pocket costs because they now haul many cars empty. The opponents of the bill claim that its passage will restore the conditions that existed prior to 1920, and enable the railroads to levy a much heavier tariff to and from non-competitive points. They feel that it will not increase employment; that it may result in ruining what competition they have now in

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Pettengill Bill

(Continued from Page 62)

terminal points, and also the advantages of development of water and motor transportation. It may result in larger revenues to the railroads, but if it does so result, that increased income will be exacted from already over-burdened interior points that are paying more than they ought to be paying in traffic rates. Producers cannot continue to ship their products if rates are increased. They are just recovering from a depression which has been felt most severely on farms. They bear an unduly large proportion of the tax burden. They are under compulsion of readjustment of their agricultural programs. The additional burden of the increased rates, which would probably result from the passage of this bill, would place them in a desperate situation.

● No New Traffic Created

The changing of the present law by the passage of H. R. 1668 will not create any new traffic. It must be intended to divert traffic from water lines and the motor trucks to railroad lines, and will result in killing off interior points. The railroads have never recognized the necessity for a fair and reasonable charge. It has always been their policy to charge all that traffic will bear, with complete disregard of public interest. The only relief from excessively high freight rates that the country has had has been the competition afforded by waterways and motor trucks. The interior of the country found great relief when the trucks came and were able to compete with railway transportation lines for traffic. The last Congress passed legislation that has tended to strangle highway transportation for the benefit of the railroads. H. R. 1668 is just another step in the process of destroying the advantages of competition and penalizing interior points.

Under the operation of the proposed bill railroad lines would be able to post their increased traffic rates and collect the same after 30 days. A shipper feeling aggrieved may appeal to the Interstate Commerce Commission for relief. If he so appeals, he will have to make his own showing before the Commission and hire his own attorney. The great distance from the National Capital and from the centers where hearings are held would make it a very expensive thing for the shippers and producers to state their cases. Such procedure would make it practically impossible to secure justice. The hearing may take many months or years, during which the railroad is allowed to collect its higher tariff. All the relief to which the railroad lines are entitled can be granted under the present law by the Interstate Commerce Commission if lines show the necessity of such relief. This is surely more just than to have the burden of proof placed on the shipper. To be sure, there is a clause in the bill which purports to place the burden on the railway, but in fact the burden will be on the shipper.

Should the Congress enact this bill into law, the Commission and the courts must accept it as a mandate from Congress to construe more liberally every question of tariff rates in favor of the railroad companies and against the shipper and the public. The Commission will have a right to believe that the Congress seeks to hamper, kill, and ruin water and motor-truck transportation.

PACIFIC MARINE REVIEW

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MAY
1937

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Steamship Association
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of the Pacific Coast

PACIFIC
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CONTENTS

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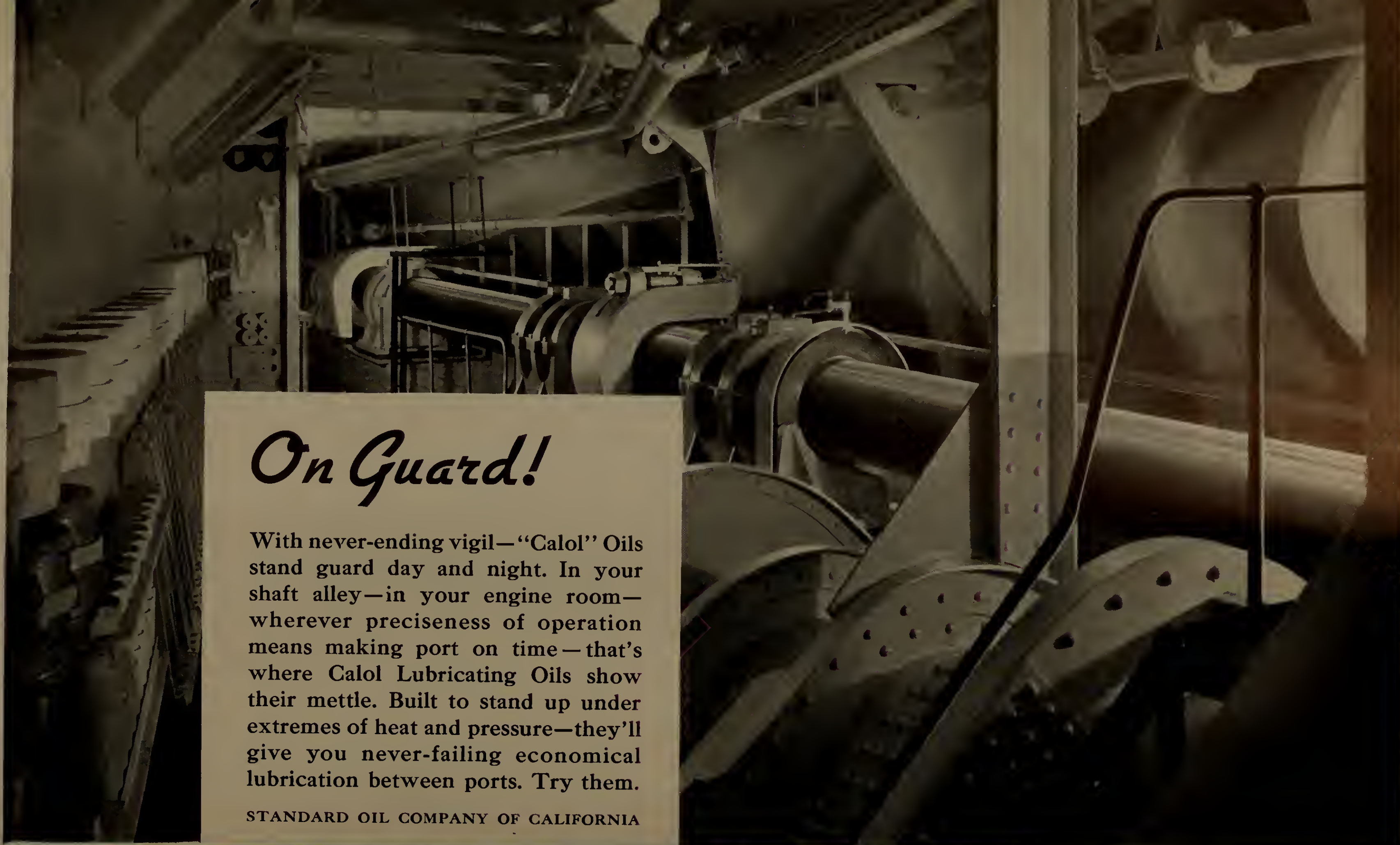

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PACIFIC MARINE REVIEW
VOLUME XXXIV MAY 1937 NUMBER 5

Editorial Comment

United States Maritime Commission

We now have a complete U. S. Maritime Commission, appointed by the President and confirmed by the Senate. The five men who now dominate the Merchant Marine of America are:

Joseph P. Kennedy (two year term), chairman;
Rear Admiral Emory S. Land (six year term);
Edward Carleton Moran, Jr. (five year term);
Rear Admiral Henry A. Wiley (four year term);
Thomas M. Woodward (three year term);
Terms all date from March 9, 1937.

Moran, a Democrat, and one of Maine's representatives in Congress, is the youngest of the group, and hails from Rockland, where he was born on December 29, 1894. He is an insurance broker by profession; was Democratic candidate for governor of Maine in 1928 and in 1930; is a World War veteran; has served two terms in Congress; and during first term was a member of Committee on Merchant Marine and Fisheries.

Kennedy (chairman), Democrat, hails from Boston. Born September 6, 1888, he was educated in public schools and graduated from Harvard (A.B.), 1912. Has a remarkable aptitude for business, as shown by his record. 1914-17, president Columbia Trust Co.; 1917-19, assistant general manager, Fore River Plant, Bethlehem Shipbuilding Co.; 1919-1924, manager, Hayden-Stone Co.; 1926-29, president and Chairman of Board, Film Booking Offices of America; 1928-29, president and Chairman of Board, Keith, Albee, Orpheum Theatres Corp.; 1929-30, president and Chairman of Board, Pathe Exchange, Inc. In 1934 Kennedy was appointed by the President to Chairmanship of the Securities and Exchange Commission.

Woodward, Democrat, Philadelphia, born in 1884, is an attorney specializing in Interstate Commerce. Princeton University, A.B., 1906; University of Pennsylvania, L.L.B., 1910; private practice, Philadelphia, 1910-1914; attorney and examiner at Washington for I.C.C., 1914-1920; attorney for Director General of Railroads, 1920-1924; private practice in Washington, 1924-1933. Under "New Deal" became: General Counsel A.A.A., 1933; vice-president U.S. Shipping Board Merchant Fleet Corporation, 1933-1935; Consumers' Counsel, National Bituminous Coal Commission.

Rear Admiral Land is recognized as one of the best construction and marine engineering experts in the Navy. Born in Colorado in 1879, he was appointed to Annapolis from Wyoming in 1898, and completed post graduate work in naval architecture at Massachusetts Institute of Technology in 1904. Working up through all the grades, he was appointed Chief Constructor of the Navy and Chief of the Bureau of Construction and Repair in 1933, retiring from that position to become a Maritime Commissioner. From 1922 to 1930 Rear Admiral Land specialized in the Bureau of Aeronautics

of the Navy.

Rear Admiral Wiley was born in Alabama on January 31, 1867. He has therefore already passed his seventieth birthday. Appointed to Annapolis in 1883, graduated in 1888, was cadet officer on Vandalia at Apia during the famous hurricane that caught an international fleet in that harbor and piled most of them up on the beach; fought through the Spanish War and commanded a division of the Atlantic fleet in the World War, both with distinction; was permanently commissioned with the rank of Rear Admiral, May, 1921; served on General Board of Navy Department with rank of Vice Admiral, 1923 to 1925; served as Commander in Chief U. S. Fleet with rank of Admiral, 1927-1929; and at his own request was transferred to the retired list from September, 1929, after 40 years' continuous service. Rear Admiral Wiley represents the finest type of American naval officer, and has always held the high esteem of commissioned officers and the rank and file in the United States Navy.

On the decisions of these five men depends the future of the American Merchant Marine. Ample power is given to them by the Merchant Marine Act of 1936 to either "make or break" every shipping operator in America.

The chairman is one of the smartest manipulative-executives in American business today, and is in his prime. Moran is apparently a professional politician, also in his prime. Woodward, 53 years of age, is a brilliant political attorney. These three represent the Democrat party. The two rear admirals represent all that is best in the U. S. Navy, and are perfect neutrals so far as political party representation is concerned. Individually and collectively, under the restrictions of choice imposed by the enabling act, this Commission represents a good cross-section of the American public. Sectionally it represents only that small portion of the country lying east and north of Washington, D.C.

Feed the Brute

In the Nautical Magazine for April, 1937, appeared an article under the above caption, by "Dixie," advising the British shipowner to pay more attention to proper food for the crew aboard cargo carriers. Since we have been hearing a lot of "communist inspired propaganda" on the poor food served aboard American ships, perhaps this excerpt may be interesting as coming from a British merchant marine officer:

"Whenever I think of ships and food my mind switches back a long number of years to a very small ship on the Pacific Coast. Until then I had been used to British tramp feeding. I do not say it was bad. It was probably as good as the general run, and as there was no particular shortage of grub, except on an odd occasion, it was accepted as good enough and that is about all one can say for it. Then I joined the small Pacific coaster. The evening I went on board with my dunnage I asked the mate when we turned to in the morning. (Yes, I was a mere deckhand, although I had a foreign-going second mate's certificate. A man must eat to live; and must work to eat.) Eight o'clock I was told. And when do we have breakfast? The mate looked at me in surprise. He knew I was new to the coast, but it obviously seemed an eyeopener to him to think that anyone started work until he was fed. He told me rather pityingly that we had breakfast before we turned to. I shall always remember that breakfast. Although I had been out of a ship I had not been suffering from lack of food, so it was not unusual hunger that prints it on my memory. It was the comparison between it and tramp food that impressed me.

"The half dozen or so deckhands sat down at a long table with a *clean* cloth and decent table gear already laid for them by the cook-steward. There was coffee, porridge, fish, ham and eggs, toast, butter and marmalade. The cook-steward acted as waiter too, and fetched the grub to us. It seemed a great feed to me, and when the cook-steward-waiter stuck his head in and asked if anyone wanted more ham and egg I nearly passed away. We had no whack, no rations. We were given as much food as we wanted. It was in another coaster that a huge dish of stewed apples, an enormous ashet of newly baked scones, and a pot of hot coffee were available all day long (and maybe all night too, I forget) for the crew. At any old time they liked they could dig in and eat as much as they liked. And we liked; I never knew I could eat between meals until I tried."

Differential Tariffs for Panama Canal

American shipowners have often expressed their opinion that commercial shipping is paying far more than its share of the cost of the Panama Canal, and the equities in the case demand some adjustment of tariffs. The most recent statement along these lines was published as of November 30, 1936, and is an elaborate book of some 180 pages, with numerous graphs and tables, setting forth the position of the American Steamship Owners Association, the Pacific American Steamship Association, and the Shipowners Association of the Pacific Coast.

One section of this volume discusses various types of differentials, with the thought in mind that their application at Panama might be desirable and practicable in reducing the imperfections of a rate system based on net tonnage. The most promising type, and the one highly recommended by the shipowners, is the Repeated Transit type. Statement of the shipowners follows:

In the shipping world it has long been the practice to extend to vessels making regular frequent calls a reduction from the charges applicable to the vessels making only occasional calls. Lines and berth services whose use of the facilities provided may be counted

upon to contribute a definite amount towards the cost of the facilities are recognized, and justly so, as entitled to special treatment. Such preferential treatment encourages the use of the facilities and tends to permanent and increased trade relations.

The Port of Antwerp grants a reduction of 33 per cent in port charges to a vessel which has made more than ten visits during a 12-month period, and a further reduction of 20 per cent of the basic rate after 20 visits during that period. A reduction of 25 per cent on these rates is granted to vessels belonging to regular lines which ply a passenger service between Antwerp and trans-oceanic countries, which moor at river berths, and which make at least five voyages per year.

The Kiel Canal after ten passages grants a reduction of 40 per cent, and after eighteen passages a reduction of 60 per cent in the rate of tolls for any further transits during the same calendar year.

This principle that some concession is due the regular customer is recognized not only in commercial dealings, but also in the assessment of port dues in the United States. The United States Government imposes a "tonnage tax" on each entry of a vessel from a foreign port, but after the first five visits of a vessel in any one year no further charge of this nature is made for its subsequent entries during that period. (Navigation Laws of the United States, 1935, page 148: 46 U. S. C. 121, Section 14.)

During the fiscal year 1935 the number of vessels which made more than five transits of the Panama Canal was as follows:

Transits	Vessels U. S.	Foreign	Total
6 or more	190	144	334
7 or more	128	59	187
8 or more	92	40	132
9 or more	60	26	86
10 or more	38	21	59
11 or more	25	13	38
12 or more	22	10	32
14 or more	16	10	26
17 or more	10	10	20

A differential for repeated transits is consistent in principle with the practice elsewhere established and with our own navigation laws.

It is obvious that the application of this differential should not bring tolls so low as to induce the establishing of transfer services, and that any rule adopted for this purpose should apply to all vessels without distinction as to character or nationality.

It is recommended that a repeated transit differential be applied to Panama Canal tolls, whether the vessel be laden or in ballast, and that the differential consist of a reduction of 5 per cent on the sixth transit, 10 per cent on the seventh, 15 per cent on the eighth, 20 per cent on the ninth, and a maximum of 25 per cent on the tenth and succeeding transits in one fiscal year.

Assuming laden transits in each case, this differential would result in the following reduction for tolls per trip and for total annual tolls for a vessel making six or more transits during the year.

Transit	Reduction, per cent Per Trip	Total
sixth	5	0.83
seventh	10	2.14
eighth	15	3.75
ninth	20	5.55
tenth	25	7.50
eleventh	25	9.09
seventeenth, etc.	25	14.44

Notable Marine Engineer Passes

Many old timers on the San Francisco Commercial Exchange and the San Francisco Embarcadero have been missing the shrewd, kindly counsel of A. L. Becker, noted consulting marine engineer, who passed away April 14 at his home in Burlingame, California, after a long illness.

Born in Michigan in 1867, Becker was educated in the public schools of that state and graduated from Ann Arbor in naval architecture and marine engineering. He was long associated with the Craig Shipbuilding Company at Toledo, Ohio, and came with that firm to Long Beach, California, in 1906 as chief engineer. When the Schaw Batcher Shipbuilding Company was organized in 1917, A. L. Becker was secured as general manager, and under his direction that yard made a very creditable war-time record in building steel cargo steamers for the U. S. Shipping Board Emergency Fleet Corporation.

After the close of the shipbuilding program, Becker established himself as a consulting engineer in San Francisco.

He had a very highly developed capacity for simple analysis of difficult problems, and his services were of great value to many steamship lines. His warm, genial personality endeared him to many friends. He took a keen interest in the progress of younger men and a great delight in assisting them to correctly solve their problems. He was a good American, an adornment to his profession and a valuable citizen in his community.

Our sympathies are extended to his bereaved family.

Pacific Marine Review Twenty-Five Years Ago

On the 15th of May, 1912, when No. 5, Volume IX of Pacific Marine Review was issued at Seattle, Washington, that "first established and only exclusively marine paper published on the Pacific Coast" was concerned mainly over three matters:

First, the impending opening of Panama Canal, and its probable effect on world commerce.

Second, the maritime legislation impending at Washington, and its probable effect on American merchant marine.

Third, the sinking of the Titanic.

The lead article, covering the first of these topics, was a statement by the late great Herr Ballin, director general of the Hamburg Amerika Line, translated especially for Pacific Marine Review by Mr. Rudolph Falcks, general European agent of the Southern Pacific, with headquarters at Hamburg. The following quotation is of interest, considering the identities and connections of the author and the translator:

"Many of the large shipping companies—English, German and others—state that they have investigated the possibilities of the canal, and are considering the establishment of new lines through that channel.

"One does not need to accept all these declarations too seriously. In many cases the bases will only be the intention such as one may have who leaves his umbrella on a chair and believes thereby that he has secured a seat."

Very pregnant is this excerpt.

"Commerce between American ports is, in virtue of American legislation, confined to the American flag. It follows from this that the American mercantile marine will in future experience great augmentation, and it would be stupid on our (German) part if we did not view this growth of the American merchant marine with the greatest of good will. Foreign shipping companies interested in the North American trade have undoubtedly contributed greatly to the present prosperity of the United States, and the United States owes very much to them. Notwithstanding this, they are actually subjected to constant attacks, and must submit to decisions of the United States government for a legal investigation as to whether these companies are entitled to conclude arrangements tending to exclude ruinous competition between one another.

"Inasmuch as the United States will, no doubt, be in a position to create for itself a large mercantile marine, it is to be hoped that they will learn the imponderabilities which are necessary for the upholding and protection of a mercantile fleet, and that they will then be better posted in respect to the importance and use of such a fleet."

Little did this wise German shipowner realize the tragic circumstances under which his prediction of a large United States merchant fleet would be fulfilled.

A seaman's bill (the forerunner of the LaFollette Seamen's Act) was pending in the House, and called forth a statement from the Pacific Coast Steamship Company to the Committee of Merchant Marine and Fisheries. This statement ends with the following pregnant paragraph:

"It should be apparent that a seaman's opportunity for employment will be in direct ratio to the number of ships employed, and therefore that regulations apparently in the interests of seamen which tend to limit the number of ships in operation must necessarily react unfavorably on the seaman. Of such character we regard the provisions of the bill referred to."

This statement was apparently prophetic. Today (25 years later) through congressional enactment and through labor union rules, all of the "provisions of the bill referred to," and a number of others, are in force. Today the Pacific Steamship Company (successor to the Pacific Coast Steamship Company), after seventy-five years of Pacific coastwise service, is not running a single vessel, and there is practically no Pacific coastwise passenger service operating.

"*Titanic,* Br. Str., from Southampton, April 11, for New York, ran into an iceberg on April 14 and sank in deep water with large loss of life." (1600 persons missing.) So runs a notice in the casualties list in Pacific Marine Review, May, 1912. Elsewhere in the same volume we read:

"This is the largest total loss the marine insurance market has ever suffered." It was estimated to be: hull and disbursements, £1,500,000; cargo, £250,000; compensation for passengers, £700,000; compensation for crew, £300 for each life lost.

Editorials called attention to: the deplorable ignorance of the investigating senators, as evidenced by the questions asked; the necessity of "revising obsolete laws regarding lifeboats and other safety equipment, and of bringing same nationally and internationally to the standard of efficiency demanded by modern steamship transportation"; a declared policy that "Pacific Marine Review will proceed cautiously until all facts and circumstances have been carefully measured and considered by competent authorities both in the United States and in the United Kingdom, and will not identify itself with any ill-considered and impulsive attack

on the great steamship lines.

"The public can best assist in contributing to its own safety by destroying its own insensate appetite for speed, extravagance and luxury, which demand excess speeds in dangerous waters; master, chief engineer and owners all equally driven by this madness of the age in public competition."

As we were compiling the foregoing, Captain E. Francke, now retired and living in San Francisco, dropped in for a chat. A few moments later, in came Chief Engineer Ernest Prince, also retired from active sea duty and just returned from Chicago, where he has for some years been chief engineer of the Chicago Mart, said to be the largest commercial building in the world. On this pair of old sea dogs being introduced, it developed that they had been shipmates as first officer and third assistant engineer on the S.S. St. Louis, of the American Line, way back in 1905, and had not seen each other since. The air was soon full of remember whens:

"When a boy had to set a box on the bridge for Captain John Clark Jamison, so that he could see over the dodger; but no man, no matter how big he was, ever ventured more than once to take any liberties with that little man.'

"When that 'little' captain was the biggest man in the American merchant marine, ruling with iron discipline, and yet with an impartial fairness that won for him the admiration and respect of officers and crew.

"When storm doors were shut coming out of Southampton, and on many voyages no member of the engineer staff or the black gang saw the deck again until past Sandy Hook.

"When officers standing watch on the bridge would come off the four-hour watch with their whiskers, mackinaws, and sou'westers a mass of ice, and by the time they had chopped or thawed this ice, gulped down biscuit and hot coffee, and hit their bunks, would be called on watch again.

"When day and night driving was the rule through thick weather or clear, fog, sleet, hail or rain.

"When the engineer on watch was always on a standby signal, with the engines almost invariably full speed ahead.

"When the black gang shoveled 310 tons of coal every 24 hours into her 64 furnaces, and the coal was figured so carefully that we often had to sweep the bunkers with a broom—a broom, mind ye—to get the old hooker into port.

"When the Titanic, going out through Southampton Channel on her first (and last) voyage, created such a suction in the narrow waterway that the American Line steamer New York broke all her mooring hawsers and followed the ill-fated super-liner down the stream until rescued by tugs.

"When the passengers, the crew and all officers obeyed the 'Old Man' with a readiness and a respect that have now disappeared from the sea."

And so on far into the night.

"The Little Commodore"

Commodore John Clark Jamison.

Dedicated to the Memory of Captain John Clark Jamison

Late Commander of the
U. S. Mail S.Ss. "St. Louis" and "St. Paul"
By his former Chief Officer

In manly pride you knew thy ships—from truck
to keel, from stem to stern,
And thy observance always keen, for no intricacy however small,
Could e'er escape thy eagle eye—aloft, on deck
and far below;
Therefore—IMMACULATE they were—S. S.
"St. Louis" and "St. Paul."

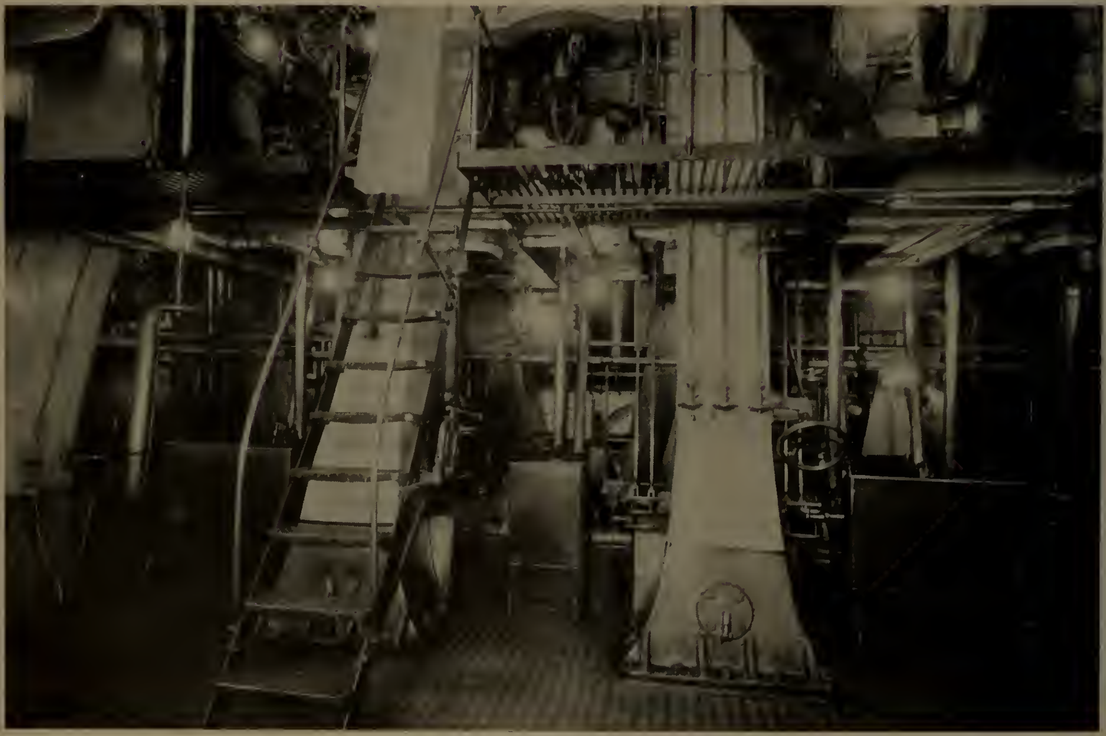
Thus, thou livest on—in memory of those who
do respect thy traits,
Who long ago and still endearingly call you
"The Little Man"!
Aristocrat of quality in mind and heart thou
wer'st and those who scorn you,
Let them aspire more—and try—excel thee as
a MASTER if they can!

E. Francke

San Francisco, Calif.

SINGING LIKE THE MORNIN' STARS
FOR JOY THAT THEY ARE MADE

The reason for this outbreak of sentiment and statistics on marine reciprocating steam lies in these two beautiful photographs of the 4000 I.H.P. Quadruple Expansion engine on the American-Hawaiian intercoastal cargo carrier Dakotan, taken especially for Pacific Marine Review by Walter Scott. At left, a fore and aft view along the crank shaft, showing connecting and eccentric rods. Below, a general view on the working platform. The Dakotan and this engine were built by the Maryland Steel Company (now Bethlehem Sparrows Point yard) in 1912. This engine is a four cylinder unit 25¼ inch x 34 inch x 49 inch x 70 inch cylinders by 54 inch stroke with a 15¼ inch crank shaft. It operates on 215 pound steam pressure.



Multiple Expansion Steam

The marine triple expansion steam engine was developed during the eighties of last century, and reached substantially its present form by 1890. It therefore had the start on its present rivals, the steam turbine and the diesel engine, by from 10 to 15 years.

Probably no other mechanical device ever took such a deep rooted hold on seafaring engineers as did this balanced triple expansion steam engine. Before 1900 practically every seagoing steamer was propelled by a triple or a quad.

"Well, what of it?" says some reader; "those were the days before the war. High pressure steam turbines and diesel engines are the modern methods of marine propulsion, and nobody but a few old time Scotch engineers ever thinks of the departure of the reciprocating steam engine with any regret. For many years we have been reading in your magazine and others about diesels and steam turbines and very little else. Why bring reciprocating steam up again?"

Just so, good reader, was the trend of our own reflections, and to bolster them we went to Lloyd's statistics, only to find that reciprocating steam had not departed. Far from being down, it is still on top, with a very ample margin above its combined competitors. Here are the figures from Lloyd's Register Book for 1936-37, showing total tonnage in the world for vessels of 100 tons gross or over:

Reciprocating steam tonnage	42,605,474	gross tons
Turbine steam tonnage	9,108,812	" "
Internal combustion engines	12,290,599	" "
Total	64,004,885	" "

Of the vessels built to their classification in the fiscal year ending July 1, 1936, Lloyd's Register of Shipping lists:

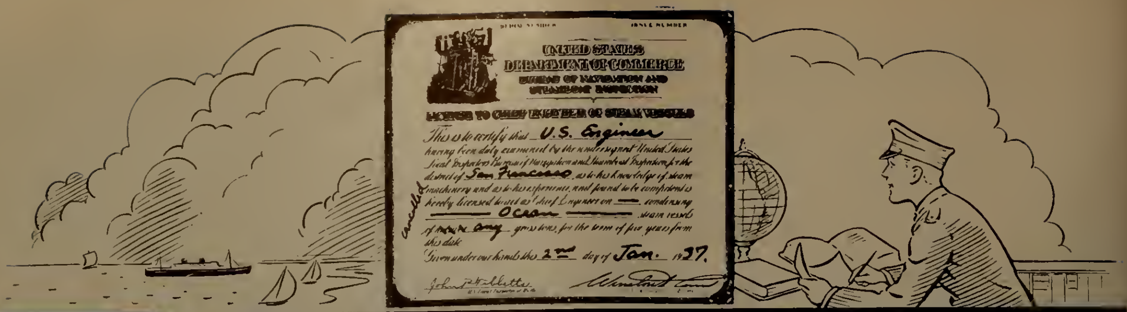
Reciprocating steam tonnage	235,998	gross tons
Turbine steam tonnage	185,398	" "
Internal combustion engines	580,410	" "
Total	1,001,806	" "

These figures indicate that 66 per cent of the self-propelled tonnage of the world's merchant fleet is driven by reciprocating steam, 14 per cent by turbine, and 20 per cent by diesel. Of the ships of 100 gross tons and up classed by Lloyd's and completed during the 1935-36 fiscal year, 58 per cent was diesel drive, 18½ per cent was turbine drive, and 23½ per cent was reciprocating steam drive. As recently as 1924-25 the reciprocating steam engine new construction tonnage classed by Lloyd's and completed that year was 65 per cent of the total.

THE RECIPROCATIN' ORCHESTRA O' STEAM

From McAndrew's Hymn
By RUDYARD KIPLING

Lord send a man like Robbie Burns to sing the Song o' Steam!
To match wi' Scotia's noblest speech yon orchestra sublime
Whaurto—uplifted like the Just—the tail-rods mark the time.
The crank-throws give the double-bass; the feed pump sobs an' heaves;
An' now the main eccentrics start their quarrel on the sheaves.
Her time, her own appointed time, the rocking linkhead bides,
Till—hear that Note?—the rod's return whings glimmering through the guides.
They're all awa! True beat, full power, the clanging chorus goes
Clear to the tunnel where they sit, my purring dynamoes.
Interdependence absolute, foreseen, ordained, decreed
To work, Ye'll note, at any tilt an' any rate of speed.
Fra skylight-lift to furnace bars, backed, bolted, braced, and stayed,
An' singing like the Mornin' Stars for joy that they are made;
While, out o' touch o' vanity, the sweating thrust block says:—
"Not unto us the praise, or man—not unto us the praise!"
Now, a' together, hear them lift their lesson—theirs an' mine:
"Law, Orrder, Duty an' Restraint, Obedience, Disapline!"
Mill, forge an' try pit taught them that when roarin' they arose,
An' whiles I wonder if a soul was gied them wi' the blows.
Oh for a man to weld it then, in one trip hammer strain,
Till even first class passengers could tell the meaning plain!
But no one cares except mysel' that serve and understand
My seven thousand horse-power here. Eh, Lord! They're grand—they're grand!



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

Mr. Engineer, what question has bothered you lately? Write to "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California, and see if he can analyze it.

To get the maximum benefit from this series it is suggested that the reader go over the subjects a second time, using the pictures, cuts, and subject matter of any available text books as a cross reference. This will suggest further questions, which should be submitted to "The Chief" for comment.

QUESTION

Why are some turbine rotors small and others large in diameter, when approximately the same horsepower and steam conditions prevail?

ANSWER

Steam condition is a term used to cover the range of steam pressure and temperature through which the turbine drops the steam; the temperature and pressure at throttle and at exhaust.

Generally speaking, the small diameter is used on Parsons, or impulse-reaction designs, and large diameters on the impulse, or Curtis and Rateau designs, although the principle of operation does not dictate this difference.

The following approximate relationship expressed as an equation gives some idea of the various factors that determine diameter and length:

$Ef. \times H.P. \times \sqrt{H_1 - H_2} = K \times RPM \times N_s \times D$. where H_1 equals B.T.U. per pound of steam at admission; H_2 equals B.T.U. per pound of steam at exhaust; K is a constant to adjust units; R.P.M. is revolutions per minute; N_s is number of stages; D is mean diameter of rotor; Ef is designed efficiency of the unit; H.P. is designed horsepower of unit.

These last two factors would not be used in this expression in purely theoretical consideration. However, the larger the unit the more stages we can afford to use and the greater the efficiency we desire to obtain. Also, larger units require larger diameters to provide steam space or area of openings.

The point of interest here is that the larger the diameter the fewer stages needed, and vice versa. From this point on, designers follow two different paths:

First, those using the Parsons principle must pro-

British liner Queen Mary has most powerful turbines afloat; four sets of turbines of 50,000 shaft horsepower each.

vide for a pressure difference on the two sides of the moving vanes. This requires a close clearance, relatively, between the tips of the moving vanes and the casing. This clearance may be axial or radial, the former only when the vanes have a shroud band around their tips. Obviously they desire to keep the diameter as small as possible to reduce the circumferential length, as the area of the leakage opening is the product of the clearance and the circumferential length.

Second, those using the impulse, or Curtis, principle have no pressure to cause leakage past the moving buckets, hence have relatively large clearances and can go to diameters they choose, being limited only by the centrifugal forces (discussed in last article).

Also, the larger diameters, giving fewer stages, require much more pressure drop on the two sides of the stationary buckets (nozzles in this case), giving rise to the separation of stages by diaphragms, or circular partitions. These are carried radially inward to as small a diameter as possible, because here, too, a close radial clearance is needed to prevent steam leakage, and the smaller the diameter of the steam seal or clearance the shorter the circumferential length and the leakage area. The rotor shaft diameter limits the length of this clearance.

Thus, largely from a standpoint of reducing the steam leakage, the rotors are large or small in diameter according to whether the impulse or impulse-reaction principle is used.

QUESTION

Why does the Parsons, or impulse reaction design, usually use a hollow drum or spindle, while the Curtis, or impulse design, uses a shaft with wheels shrunk on?

ANSWER

The Parsons design requires many stages, and to provide a wheel for each stage would make difficult construction and increase the length to beyond reasonable limits. By increasing shaft diameter to the inside diameter of the vanes, and making it hollow to reduce weight, the designers are able to get the stages much closer together. Also, if wheels were used circular partitions or diaghragms would be necessary. By keeping diameter of rotors as small as possible more stages can be used in shorter length.

The Curtis designs require diameters which would make drum rotors awkward and heavy. Also, the diaphragm packing should be at as small a diameter as possible.

QUESTION

Why are large rotor shafts bored hollow?

ANSWER

This practice is not followed in marine units unless over 10,000 H. P. is on one turbine rotor and the rotor shaft is over 12 to 14 inches in diameter.

Large rotor shafts are bored hollow, not so much to reduce weight, although this is a strong reason, as to be able to test the shaft forging for flaws. A small mirror, passed through the bore and observed through a transit while slowly revolved, discloses flaws, which, if present at all, will usually show up near the center of the forging.

Another method of detecting flaws in the forging, regardless of shape or purpose, is to paint it with a mixture of fine iron filing and thin oil, then magnetizing the piece. Cracks, invisible to the eye, will be outlined by the regularity of arrangement of the iron filings along the line of fault.

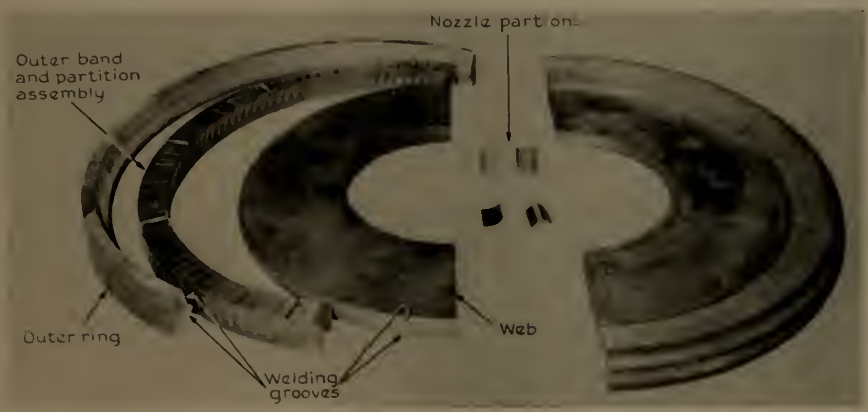
Rotors without wheels are called drums, and are hollow for lightness. Holes are provided, venting the hollow space to steam at some intermediate pressure. The hollow centers must be bored very true to the journals, as water may collect, and at speed it spreads around so that the surface of the water is a true cylinder with center coaxial with center line of rotation. If inside surface of drum is eccentric to center of rotation there will be more water on one side than the other, throwing the machine out of balance.

QUESTION

Why are shafts of turbines so much larger than would appear to be necessary?

ANSWER

Shafts of turbines using wheels to carry the buckets are much larger than would seem necessary to carry the weight of the wheels or the torque or twist forces because it is necessary to have a very definite stiffness. The stiffness is one factor which determines the critical period of vibration, on which much will be said in a later article. The stiffer or stronger the shaft is, the higher the speed at which the critical vibration occurs. It is always desirable to have this critical above



Punched band turbine diaphragm. One half ready to be assembled at left. Other half complete at right.

normal speed, but in large turbines this would require a prohibitively large shaft, so that, instead, the shaft is proportioned to bring the critical at a speed between one-half and full speed. It would never do to have it occur at normal speed, as maximum vibration occurs at the critical speed.

QUESTION

What test can be made on board ship for a crack in the shaft or in the wheel of a turbine?

ANSWER

If a crack is suspected but invisible, or as a routine check, the wheel may be painted over with kerosene, and, after allowing it to soak in any possible cracks for a few minutes, all the surplus wiped off. Then paint the wheel with a mixture of chalk and water and allow to dry. Any cracks or crevices will contain kerosene, which will soak back out into the chalk, clearly marking the location of the crack.

QUESTION

Why is one type of packing used in one place and another type used on other places?

ANSWER

There are really only three different kinds of packing used, either where the shaft comes out of casing or between stages, called diaphragm packing. Soft packing, with a packing gland similar to rod packing on pumps, has been used on small turbines, but is rarely used any more, as shaft speed is so high that, regardless of material used, it cuts or scores the shaft.

The three types are: (1) The **Labyrinth;** (2) the **Carbon ring;** (3) the **Water Seal.** The word steam seal is frequently used but it may be any of these types, and merely refers to the seal used to hold back steam pressure, and differentiates it from the packing gland normally used on engines and pumps. The steam seal is any seal which does not permit actual contact between the gland and the revolving shaft, but, instead, uses close clearance.

The difficulty of holding a close clearance of packing to shaft and yet not have actual contact lies in the conditions: First, that the shaft may not run true; second, that at certain times, principally starting and coming up to speed, the shaft may throw out of true for a short time as much as several mils (a mil is .001 inch). Contact with a rigid surface not lubricated would immediately cause severe heating of the shaft at point of contact. This expansion operates to spring the shaft still further out of true at same point, produces unbalance, and may finally force shut down. Thus packing must be designed so that shaft contact quickly wears a clearance.

Labyrinth packing meets this condition. The many fine edges of copper or other soft metal mash or wear to a clearance if touched. At same time, they may be made to a very close clearance. The number of thin edged rings is proportional to the steam pressure to be held back. There is always some leakage, which must be drained off to the exhaust end or intermediate stages, and a final feather of steam to leak into the engine room. This may be piped to a condenser to save water, but usually it is important to let it pass through some visible space, so that the operator may know both that there is some leakage and that it is not too much. The exhaust end, condensing, is furnished steam from the leakage of the high pressure end, which must be enough to insure steam leaking out into engine room, rather than air leaking into the turbine. Varying loads and clearance of labyrinth rings varies the amount of steam necessary, so that valves are provided to regulate the supply to glands. This may be handled automatically by a special regulator designed for the purpose. Labyrinth packing is used on all turbines.

Carbon Packing is used on small units less than 1000 H. P. or shaft diameters less than approximately 5 inches. Carbon is selected which will wear quickly if the shaft touches strongly, but more particularly is spring mounted in its housing so that it can move radially to accommodate movement of shaft. Slight touching moves carbon ring without serious shaft heating. However, long or heavy rubbing will cause dangerous shaft heating and vibration.

The Water Seal is created and maintained by the impeller of a centrifugal pump mounted on shaft of turbine and revolving in a simple casing. It is supplied with water, and drained at points as close to shaft as possible. This seal usually can only be used in conjunction with labyrinth packing ahead of it, and it prevents the final leak of steam to atmosphere. It seals due to the water pressure built up in its casing from centrifugal force. It must be drained to prevent overheating of the water.

This type of seal is admirably adapted to the exhaust packing of turbine where low pressures are involved. Some designers object to its use on high pressure end on account of sudden changes of shaft temperature. Impulse reaction turbines having balancing dummy pistons at the high pressure end have only exhaust pressure to pack against and the water seal is suitable. This is duplicated in impulse turbines by using suitable labyrinth sections between water seal and high pressure steam and draining off the steam to low pressure stages from one or two sections of the labyrinth.

In the final analysis, the water seal is only a water condenser to condense the leakage past the labyrinth packing rings.

QUESTION

How are diaphragms constructed so as to resist the tremendous force on them due to the pressure differential on the large area, and at same time have many nozzle openings in them?

ANSWER

This is indeed a real problem. For moderate pressures and temperature 300 lbs. and 450° F. the diaphragms are made of cast iron. The steel nozzle partitions, shaped like buckets or vanes, are welded into a steel frame structure, which then is built into the foundry mold and the casting poured around it, imbedding these steel nozzles in the cast iron diaphragm. The latter is usually made slightly dish shaped to better carry the piston type thrust load.

Higher pressures and temperatures are taken care of by using steel similar to boiler plate and fabricating largely by welding, as shown in accompanying cut.

Our next issue will discuss bearings and lubrication from the design and theoretical point of view.

Pacific Merchant Marine Licenses

Name and Grade	Class	Condition
ALASKA		
I. Myhre Hofstad, Master	OSS & MS, 1000 GT	RG
Gustav Blendheim, Third Mate	OSS, 5000 GT	O
Ludwig Jacobson, Master	OSS & MS, any GT	RG
Robert A. Hill, Third Mate	OSS & MS, 1000 GT	O
Eugene M. Stitt, Master	OSS & MS, any GT	O
George E Bach, Master	OSS & MS, 2000 GT	RG
Stephen R. Rychlew, Second Mate	OSS & MS, any GT	RG
Wesley W. Carl, Third Mate	OSS & MS, 5000 GT	O
Fred J. Oaks, Chief Eng.	OMS, any GT	RG
Alonzo R. Short, Chief Eng.	OMS, 500 GT	O
SAN FRANCISCO		
Ole C. Michaelsen, Master & Pilot	OSS, any GT	RG
Lambert W. Kat, Chief Mate	OSS, any GT	RG
Harry J. Manwaring, Chief Mate	OSS, any GT	RG
Douglas W. Matthews, Second Mate	OSS, any GT	RG
Horace.E. Goode, Third Mate	OSS, any GT	O
Purdy L. Mosher, Chief Eng.	OSS, any GT	RG
Jack N. Kelly, Chief Eng.	OSS, any GT	RG
Anton C. Weber, 1st Ass't Eng.	OSS, any GT	RG
Arnold J. Madsen, 1st Ass't Eng.	OSS, any GT	RG
James M. Carroll, 2nd Ass't Eng.	OSS, any GT	O
Harry G. Ritchey, 2nd Ass't Eng.	OSS, any GT	RG
Alexander W. MacLaren, 3rd Ass't Eng.	OSS, any GT	O
Lawrence P. Mink, 3rd Ass't Eng.	OSS, any GT	O
Swen E. Westling, Chief Eng.	OMS, any GT	RG
Rudolph V. Madsen, Chief Eng.	OMS, any GT	O
PORTLAND		
Guy E. Teeling, Chief Eng.	OSS, any GT	RG
Einar Hansen, 1st Ass't Eng.	OMS, any GT	O
Wm. M. Wilburn, 2nd Ass't Eng.	OMS, any GT	O
John J. McBroom, Chief Eng.	OMS, 750 GT	O
Marcus P. Bryant, 2nd Ass't Eng.	OMS, any GT	O
SEATTLE		
Charles M. Glasscock, Third Mate	OSS, any GT	O
John MacIver, Third Mate	OSS, any GT	O
Walter L. Wicks, Chief Eng.	OMS, any GT	O
William J. Arick, 1st Ass't Eng.	OMS, any GT	RG
HONOLULU		
Alfred Buck, 2nd Ass't Eng.	OSS, any GT	O
John S. Mahar, 3rd Ass't Eng.	OSS, any GT	O
Emmit N. Weatherly, 3rd Ass't Eng.	OSS, any GT	O
SAN PEDRO		
Darrell L. Povey, 2nd Mate.	OSS, any GT	O
Lewis D. Crook, 3rd Mate	OSS, any GT	O
Earle J. McConnell, 2nd Mate	OSS, any GT	RG
Ernest W. Greenup, Chief Mate	OSS, any GT	RG
Thomas L. Skillington, Jr. 2nd Ass't Eng.	OSS, any GT	RG
George F. Conrad, Chief Eng.	MS, 1500 GT	RG

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Value of Fire and Boat Drills

Fire and boat drills aboard ship are matters that demand the keenest attention on the part of the master in order to be assured of an efficient performance on the part of the crew in case of emergency. That the utmost zeal and efficiency are being exerted in dealing with this problem is apparent from recent observations of such drills.

The masters on the S. S. Washington and the S. S. Manhattan have introduced a rather unique idea in training their crews:

Without an entire prearranged plan of conducting such a drill, the chief officer selects a certain location on the vessel, which may be in the passengers' quarters or crew space, and tacks up a red flag with the word "fire" in large letters to indicate the location of the fire for the purpose of the drill. The first person to observe the flag immediately proceeds to the nearest manual alarm and sounds a code signal which indicates the section of the ship in which the fire is supposed to be located, and then secures an extinguisher and fights the "fire" until the fire squad arrives.

The moment the alarm is sounded all blowers and fans are stopped and certain members of the crew station themselves at fire doors, corridors, and emergency stations to assist the passengers, and others are detailed to prepare the lifeboats for embarkation.

A representative of the Bureau recently witnessed a fire drill conducted in this manner and reports that the system used to indicate the fire was particularly effective in training the crew to operate in any part of the vessel.

However, interest on the part of passengers is generally lacking, and the majority of them are invariably reluctant to participate in such drills. It is questionable whether they would know just what to do in an actual emergency and such a situation would greatly add to the task of the crew should it become necessary to abandon ship.

There is a remote possibility that an emergency may arise in any means of transportation, and while the record shows ocean travel is safer than any other, it is necessary to impress the passengers with a need for their cooperation in connection with fire and boat drills.

One plan to impress the passengers with the need for being prepared to conduct themselves properly for their protection in the case of an emergency suggests itself. Such a plan would be for the larger vessels having motion-picture programs aboard to have a film prepared showing in detail a complete fire and boat drill in which a large group of passengers participate. This film could then be shown in conjunction with the ship's entertainment program for the purpose of instruction.

There can be no doubt of the desirability of arousing the interest of passengers in their own safety by following this or some similar plan. The Bureau will be glad to receive further suggestions as to how this problem might be treated effectively.

—Bureau of Marine Inspection and Navigation Bulletin.

Two New Tankers for

Standard Oil Company of California

The building of large seagoing tankers for American oil companies goes on apace in the Sun Shipbuilding and Dry Dock Company yard at Chester, Pennsylvania. At the present writing there are eleven of these large bulk carriers either on the ways or at the outfitting docks of this one yard. These eleven tankers aggregate approximately 100,000 tons gross.

Two of these tankers are of great interest to the Pacific Coast. These are contracts No. 166 and No. 167, ordered by the Standard Oil Company of California, and as yet unnamed. Pacific Marine Review, in the January, 1937, number, carried a skeleton description of these vessels, and now, through the courtesy of the owners and the builders, we are able to give our readers a more complete account.

The principal characteristics are:

Length over all	462 feet, 4 inches
Length between perpendiculars	442 feet, 0 inches
Beam molded	65 feet, 0 inches
Depth molded to upper deck at side amidships	35 feet, 0 inches
International tanker Summer draft to bottom of keel	28 feet, 7½ inches
Displacement at I. T. S. draft	17,225 tons
Deadweight capacity at I. T. S. draft	12,800 tons
Cargo capacity at 98%	103,200 (42 gal.) bbls.
Propulsion power	3500 B. H. P.
Loaded speed (trial)	13 knots

In general, these tankers are of normal form. Built on the Isherwood Bracketless system of longitudinal framing, they will have round nose stems and cruiser type sterns. The hulls are of the single screw, single deck type, with forecastle, bridge, and poop erections connected with an elevated walkway.

The specifications call for an oil tightness in bulkheads that will enable the operators to carry different petroleum products in adjacent tank spaces with no danger of contamination. In this connection it is interesting to note that 70 per cent of the hull joints are welded.

All design, construction, and equipment of hulls and machinery are in accordance with or in excess of the highest classification requirements for tanker construction of the American Bureau of Shipping, and in conformity with or in excess of the rules issued by the Bureau of Marine Inspection and Navigation of the United States Department of Commerce.

In developing this design the hull form lines were evolved after much experimental work with models in the towing basin at Washington, with the object of creating a form for the underwater body that would give good propulsive efficiency combined with maximum volumetric capacity in cargo tanks. The result is an ideal design for the owner's use in handling simultaneously four distinct petroleum products without contamination either in the holds or in the cargo discharge piping.

Structural details of the hull were designed for riveting of shell and deck plating, but with all interior joints welded. Bulb angle bars were used in the frame instead of the conventional channel bars. Seventy per cent of all the joints in the ship are welded. The weight saved by welding is used by adopting heavier members in those parts of the hull most subject to corrosion. This feature will greatly reduce maintenance and prolong the useful life of the hull.

It will be noted that the volumetric capacity of the cargo tanks at rated draft is 103,200 barrels of 42 gallons each. This capacity in a ship of this size, carrying a 3500 shaft horsepower propulsion plant and large fuel tanks, is considered an achievement of note in practical naval architecture. Few tankers afloat can equal this relative capacity, and much credit is due the technical staffs of the Standard Oil Company of California and the Sun Shipbuilding and Dry Dock Company for their cooperative work in producing this practical and economical design.

A glance at the profile herewith impresses the eye with a certain grace and liveliness in the sheer and in the rake of masts and funnel. Here, again, careful attention to details has produced this pleasing result. The foremast rake is 3/8 inch to the foot, that of the mainmast ¾ inch to the foot, while the funnel, of broader silhouette and relatively closer to the mainmast, is raked ⅞ inch to the foot.

Standard Oil of California has long been noted for its leadership in safety on tankers. The marine department of this corporation has developed many special fittings and systems for protection of oil cargoes and of tanker crews. The new tankers will embody all of this experience and, in addition, all of the proved safety features required by the Bureau of Marine Inspection and Navigation of the U. S. Department of Commerce.

● Arrangement of Hull Space

Reference to the general arrangement plans reproduced herewith shows that the hull is divided by 15 thwartship bulkheads into 16 thwartship compartments, oil and water tight. Cargo tank space is further subdivided by longitudinal bulkheads arranged port and starboard 14 feet 6 inches inboard of the ship's side. Since there are eight thwartship tank spaces, this arrangement provides for 24 cargo tanks separated from each other by oil tight bulkheads.

Building at

Sun Shipbuilding and Dry Dock Co.

From the stem aft the compartments are designated: Forepeak and stores; dry cargo hold and fuel or trimming tank; forward cofferdam; tanks numbers 1, 2, 3, 4, 5; pump room; tanks numbers 6, 7, 8, after cofferdam; fuel bunker; machinery space; and after peak tank.

The main cargo tanks all measure 34 feet in the length of the ship and 36 feet in the beam, with the exception of No. 5, in which the midship pump room is installed within those dimensions. The wing tanks are all 34 feet in the length by 14 feet 6 inches in the beam. All stiffening members on the fore and aft bulkheads are on the wing tank side of those bulkheads.

All of the deck erections are of steel throughout. The forecastle houses, on the main deck, the carpenter shop, the lamp room, the paint and oil shop, and the bosun's stores; below the main deck, the forepeak tank, the dry cargo, the chain locker, a tank for fuel oil or for trimming ballast, and a pump room.

The bridge erection includes the navigating bridge, the upper bridge deck, and the bridge deck. On the navigating bridge are the wheel house and the chart house, with a small room off the latter for the new type Sperry Master Gyro Compass.

The large porthole type windows of the wheel house are all fitted with wipers of the auto windshield type, and one is fitted with Kent Clear Vision Screen.

● Officer and Crew Accommodations

In the house on the upper bridge deck we begin to sense the carefulness with which the owners of these vessels are designing the living quarters for the comfort and health of the officers and crew. Right across the forward end of the house, with natural light and air on three sides, is the captain's suite, including a spacious and elegantly furnished office, a very commodious stateroom, and a modern private bathroom. The after end of the house is occupied by the radio equipment and the radio operator's stateroom. Outside this house the deck forms open balconies port and starboard, connected by galleries forward and aft of the house, and giving ample quarterdeck space for constitutionals. At the rail port and starboard is a 24 foot 30 person Welin lifeboat swung on Welin quadrant davits.

The bridge deck house is 16 feet larger in the beam than that on the upper bridge deck. It contains the hospital bay, six bedrooms, and four bathrooms. The first officer has a corner room with a private bath adjoining. On the port side are two spare rooms with communicating bath between. The second and third officer and the steward each has a nice room and a common bathroom. Four berths are provided in the hospital bay, which has a fine bathroom adjoining. It will be noted that this is a higher percentage of baths per person than is installed in the majority of the first class passenger accommodations afloat today.

Going aft to the deck house on top of the poop we are impressed again with the planning for comfort and convenience in the arrangement of the various spaces. On the forward end of this deck is a nice promenade space around the engine hatch and skylight equipped for awnings port and starboard. At the rail port and starboard is a Welin 24 foot 30 person lifeboat on Welin quadrant davits. The boiler hatch and the uptake of the stack are partly enclosed by the forward end of the house, which is entered by doors port and starboard of this hatch casing. These doors open on four foot passageways, which run straight through to the open deck aft of the house, forming a natural air duct for ventilation, and for insulating the living quarters port and starboard from the heat of the stack. A broad thwartship passageway connects these two fore and aft aisles just aft of the boiler hatch casing.

On the starboard side the chief engineer will have a fine suite, consisting of office, stateroom, and private bath. The first assistant engineer has a large stateroom with private bath on the port side. Second and third assistants and the machinist each has a room, and there is one spare room. These four rooms are served by a large lavatory equipped with showers, toilets, wash basins, etc. Thus for the five persons of the engine room staff there are three baths. Each bedroom is fitted with a desk, berth or berths, wash basin with hot and cold water, a spacious locker, and comfortable chairs and sofas.

Below the poop deck house space provides room for the galley, the bakery, the laundry and linen rooms, the officers' mess, the crew's mess, the crew's lounge, two bathrooms, and four bedrooms. The bedrooms are each for two persons, with the exception of the first cook's room, which is private.

Galley, bakery, and laundry are grouped centrally as a continuation of the boiler hatch casing, and are equipped with the most modern machinery, of adequate capacity to take care of the ship's requirements. A W. S. Ray oil burning range is used in the galley. Here, again, we find a wide passageway fore and aft dividing the living quarters port and starboard from this central casing. These passageways have doors at the forward end but are open at the stern end. In the officers' mess 14 sit down comfortably at table. In the crew's mess there are seatings for 22. The crew's lounge is approximately 14 x 18 feet, and is furnished with a read-

ing table, two card tables, and comfortable lounging chairs.

On the upper deck under the poop there are five rooms on port side for firemen, oilers and wipers, and six rooms on starboard side for seamen. Two toilet and bathrooms are provided, one on each side of ship. Each room has a desk and chair, a bench, a wash basin with hot and cold water piped, two lockers, and two berths. Aft on this deck are the refrigerated stores and the steward's storeroom. Three insulated cold storage boxes are installed, one for meats, with 775 cubic feet; one for vegetables, with 560 cubic feet; and a small utility box.

Throughout these quarters the furniture is all of metal, the berths are all of Simmons make, all partitions other than steel bulkheads are metal faced paneling with fire resistant core. Four stairways provide easy connection between deck levels, and access to every division of the enclosed space is made easy and convenient.

In all of these quarters the steel plating of the ship is carefully insulated for comfort. Mechanical and natural ventilation is provided throughout. Steam heat is available in all rooms, and a built in radio installation makes broadcast programs availble with a "plug in" receptacle in each room.

● Propulsion Machinery

The steam propulsion power plant on these vessels is designed and arranged for maximum reliability and fuel economy. It comprises: Two main boilers for generating steam at 425 pounds pressure and 725° F. total temperature; and a cross compound double reduction geared turbine unit with the proper complement of condensers, pumps, evaporators, distillers, fuel oil heaters, feed water heaters, lubricating oil coolers, and lubricating oil purifiers.

Babcock and Wilcox designed and built the steam generating plant, which includes two main propulsion boilers and one auxiliary boiler.

All of these boilers are of the well known B. and W. marine water tube Sectional Header Type.

Each of the main boilers will have a total water heating surface of 3596 square feet, and will be capable of a normal evaporation of 17,000 pounds of steam per hour at 425 pounds pressure and 725° F. total temperature. They will be fitted with interdeck type superheaters, Diamond soot blowers, and Hagan combustion control. Each main boiler has three mechanical atomizing fuel oil burners of Hex-Press type, built by the Todd Combustion Equipment Company.

The auxiliary boiler is of the same type as the main boilers, but no superheater is installed, so that the water heating surface is increased to 4480 square feet, and four Todd Hex-Press type burners are used, giving this boiler a capacity for evaporating 33,700 pounds of steam per hour at 425 pounds pressure. This unit is largely used to meet the large requirements in steam of the turbines driving the cargo pumps.

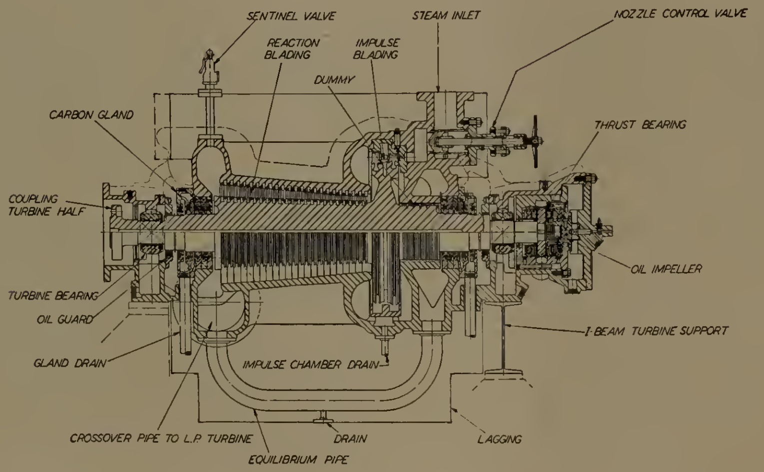
All three boilers are mounted on a half deck at the after end of the machinery space, with a relatively short main steam lead to the turbine. All valves in the high pressure steam lines are of Crane make.

Three Worthington steam driven pumps serve these boilers. Pure feed water is insured by ample tank capacity for make up fresh feed water in the double bottom tanks under the engine room space, plus the installation of a large capacity evaporator, a distiller, and a fresh water distilling set, all by the Davis Engineering Company. On its way to the boilers, feed water passes through a first stage heater of the Worthington deaerating type, and through a second stage heater of Davis make.

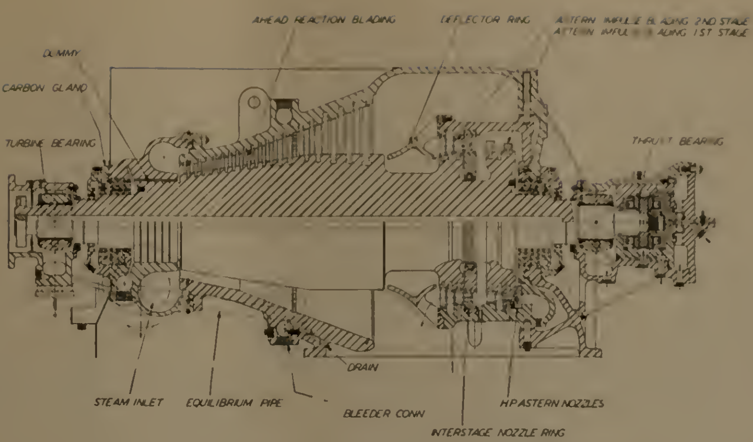
Fuel oil is pumped to the burners under proper pressure by two Northern Rotary fuel oil service pumps, the oil from each pump passing through a Davis Engineering Company fuel oil heater. Three Worthington pumps take care of fuel oil transfer from forward to after bunkers, from wing to midship bunkers, or from any bunker to service tank.

● Geared Turbine Installation.

The main propulsion turbine units for these two tankers are being designed and built by the Westing-



Section through high pressure cylinder and rotor of Westinghouse cross compound turbine of type to be installed in the new tankers described in the accompanying article.



Section through low pressure cylinder and rotor incorporating astern elements of Westinghouse cross compound turbine of the type to be installed on the new tankers described in the accompanying article.

house Electric and Manufacturing Company at their South Philadelphia Works. The turbines are of the cross-compound impulse reaction type, driving the propeller through a single case, double reduction gear at a normal speed of 85 r. p. m. The turbines are designed to develop 3600 s. h. p. during normal operating conditions, when supplied with steam having a pressure of 375 lbs. gauge and a total temperature of 700 deg. F. The designed vacuum is 28¼ inches, based on 80 deg. injection water. Manually operated nozzle control valves are provided for varying loads and for use should the steam conditions vary from the designed values. Two openings, one in the impulse chamber of the H.P. turbine and one in the cross-over pipe, are provided for extraction of steam for feed water heating.

The turbines are mounted on the gear and the condenser, and no separate foundations are required for those units. The condenser is hung from two heavy I-beam type supports, which are mounted on the gear case at the aft end and on a separate foundation at the forward end. Consequently, the alignment of the low pressure turbine, which is bolted solidly to the exhaust opening on the condenser shell, is not influenced by expansion or contraction of the condenser.

● Turbines

The high pressure turbine consists of a two-row impulse wheel, followed by twenty pairs of rows of reaction blading, as illustrated. The low pressure unit has nineteen pairs of rows of reaction blading for ahead operation and, in addition, the astern turbine, comprising two, two-row impulse wheels, is mounted inside the exhaust end of this unit.

All blading is corrosion resisting steel and is of the latest, most efficient design. The blades are held in position by means of modified T-roots, except for the stationary impulse blades and the last stationary row of reaction blades, which use a somewhat different type of fastening. The reaction blades used in the high pressure turbine are comparatively short. To provide an effective seal against tip leakage, shrouding (in conjunction with thin seal strips) is employed to maintain small radial clearances. The shrouding of corrosion resisting steel is made in sections fitted over tenons on the ends of the blades and welded in place. The sealing strips are made from thin strips of corrosion resisting molybdenum steel and are securely fastened by being rolled into grooves. These sealing strips are removable, and can be renewed if the clearance between them and the corresponding blade shrouds should increase too much. The same type of sealing strip is also used for the dummy cylinders. This construction has been used in many Westinghouse turbines in late years, particularly the high temperature units, and has proven very satisfactory.

Turbine rotors are of the solid type, made from carbon steel. A hole is drilled through the center of these forgings of sufficient size to permit minute examination for flaws.

The mechanical arrangement of the two rotors is somewhat similar, there being an overspeed governor impeller and a Kingsbury thrust bearing at the forward end. In the high pressure turbine the dummy is located at the forward end, whereas in the low pressure turbine it is at the aft end.

The astern turbine cylinder is a separate steel casting, carried inside of the main low pressure cylinder on brackets and radial pins, so as to be free to expand and contract independently of the main cylinder, and thus avoid imposing undesirable distortions on the low pressure turbine casing.

A very simple and effective type of governor is provided, which consists essentially of a centrifugal oil impeller mounted on the forward end of each rotor, and using oil from the lubricating system as an operating medium. As the discharge pressure from a centrifugal pump varies as the square of the impeller speed, a very positive governing action is obtained.

Steam enters through a steam strainer and passes to the two maneuvering valves located on each side of the strainer in the same casting. These valves are connected to the oil operated governor piston through a system of links, and to independent handwheels for ahead and astern operation. The governor operating piston, mounted below the two valves, is so arranged that it tends to lift against a heavy spring located above the piston when oil from the lubricating system is admitted. Hence a loss of pressure in the lubricating

oil system will close the valve and shut off steam to the turbines automatically. The governing mechanism consists of an oil relay mounted below the operating piston and actuated by oil from the governor impeller. The governor oil forces a small relay piston downward against a spring, which may be adjusted for small variations in maximum speed. A rod, extending from the top of the relay piston through a reamed hole along the axis of the operating piston, serves to regulate the flow of oil to or from the lower side of the operating piston. When the maximum speed is approached the relay rod moves downward, closing the oil pressure supply to the operating piston and opening ports to release the pressure below the piston, thereby permitting the spring to force the operating piston down and throttle the maneuvering valve, thus preventing the turbines from exceeding a predetermined maximum speed.

In this governor mechanism all danger of sticking is eliminated, and any tendency to over speed when operating in a heavy seaway will promptly throttle the steam flow and keep the turbines running within fairly close limits of speed. It will be obvious that this scheme for overspeed control possesses none of the objectionable features of the conventional mechanical tripping device, which under similar conditions, may shut down the unit completely.

● Main Reduction Gear

The double reduction Westinghouse gear reduces the speed from about 5100 revolutions per minute on the high pressure turbine and 360 r. p. m. on the low pressure turbine to 85 revolutions per minute on the propeller shaft at 3600 brake horse power. The turbines are connected to their respective pinions by means of a drive shaft having two couplings of the sliding type, one at each end of the connecting shaft. The gear housing is of fabricated construction and is provided with a large number of inspection openings to permit inspection of any important part of the gear with ease and convenience. All bearings are accessible for inspection, and may be rolled out after removing the bearing caps without disturbing any other parts. Each pinion bearing is supported on four pads with adjustable liners, to provide for proper alignment of the rotating parts of the gear. A Kingsbury propeller thrust bearing is mounted on the forward end of the main gear shaft.

The pinions are made from heat treated nickel steel, and the gear rims are made from forged low carbon steel.

By mounting the high speed gear wheels on the low speed pinions, between the two helices, the high speed pinions become very short and only two bearings are required for each pinion. The aft end of the high speed pinion driven by the high pressure turbine, has an integral flange which is connected to a motor driven turning gear. A sliding pin type coupling, operated by a hand wheel, is used to connect the turning gear to the pinion when in use.

Minimum weight of moving parts not being of primary importance, the gear wheels are made from cast iron having forged steel rims shrunk on and held in place by securely locked screwed pins.

● Main Condenser

The Westinghouse main condenser, which is of fabricated construction except for the water boxes, is hung between two longitudinal beams. These beams form part of the shell end flanges, and are further stiffened to an I-beam section by plates welded to the upper and lower edges of the beam. Such a design is, of course, practicable only where fabricated construction is used. The upper part of the condenser shell is so designed that it forms two transverse beams merging into the exhaust connection, and the whole structure thus forms an exceedingly rigid support for the forward end of the turbines.

The steam side of the condenser is of the radial flow type, and the cooling water makes two passes through the tubes, entering and leaving on the port side. The condenser, which has 4700 sq. ft. cooling surface, is designed to maintain a vacuum of 28¼ inches when supplied with 5750 gallons per minute injection water at 80 degrees Fahrenheit and condensing 28,500 lbs./hour exhaust steam. The hotwell has ample capacity and is of the deaerating type. It is specially designed to prevent steam and non-condensable gases in the condenser from entering the condensate pump suction when the level of the condensate is less than at the normal capacity of the pump. The tubes are rolled in the tube sheets at both ends and an annular diaphragm, placed between the periphery of the tube sheet and the shell flange, provides the necessary flexibility for expansion and contraction.

The Westinghouse air ejectors are of the twin, two-stage condensing type. The inter and after condensers use condensate only for cooling purposes and no salt water is used. Each set of air ejectors is provided with shut-off valves so that either side may be isolated.

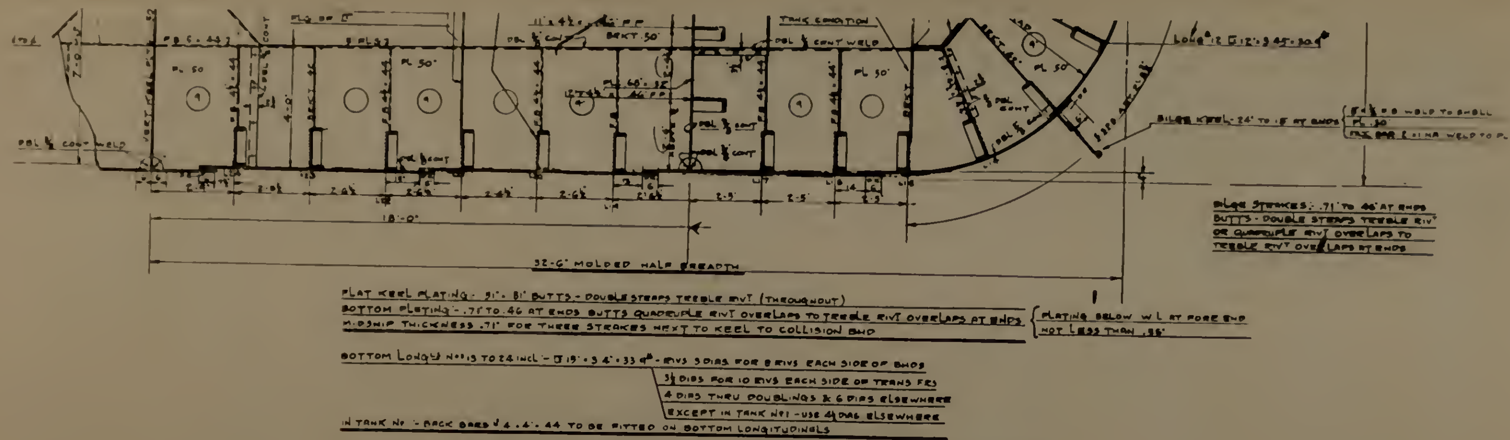
The main condenser is served with cooling water by a Worthington circulating pump. Two Worthington condensate pumps serve the hot well.

The lubricating oil system includes: Two Northern Pump Company service pumps; one Gould manually operated service pump; two Davis Engineering Company lubricating oil coolers; one De Laval centrifugal lubricating oil purifier.

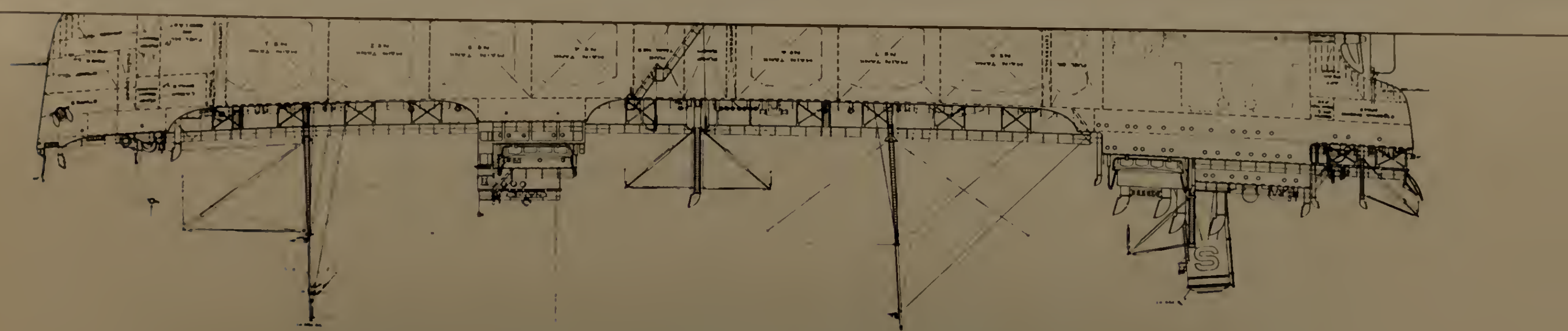
● Electric Light and Power Plant

Located on a flat on the port side of the engine room, the turbo-generators on these tankers will be 29 ft., 6 ins. above the base line of keel, or slightly above the loaded water line. Two General Electric 125 K.W. generators direct connected to General Electric turbines taking steam at 425 pounds pressure are installed for regular service. One 50 K.W. General Electric turbo-generating set is installed for emergency and pier side operation, taking saturated 200 pound steam. All wiring, switchboards, control boards, motor starting switches, motor control rheostats, light outlets, and fixtures will be selected and installed with the greatest care, in accordance with rigid specifications developed in the accident prevention work of the owners.

The turbo-generating sets are served in common by one auxiliary condenser, one air ejector, one circulating pump, and one condensate pump, all of Worthington design and manufacture.



Midship Section, New Tankers for Standard Oil Company of California



oil system will close the valve and shut off steam to the turbines automatically. The governing mechanism consists of an oil relay mounted below the operating piston and actuated by oil from the governor impeller. The governor oil forces a small relay piston downward against a spring, which may be adjusted for small variations in maximum speed. A rod, extending from the top of the relay piston through a reamed hole along the axis of the operating piston, serves to regulate the flow of oil to or from the lower side of the operating piston. When the maximum speed is approached the relay rod moves downward, closing the oil pressure supply to the operating piston and opening ports to release the pressure below the piston, thereby permitting the spring to force the operating piston down and throttle the maneuvering valve, thus preventing the turbines from exceeding a predetermined maximum speed.

In this governor mechanism all danger of sticking is eliminated, and any tendency to over speed when operating in a heavy seaway will promptly throttle the steam flow and keep the turbines running within fairly close limits of speed. It will be obvious that this scheme for overspeed control possesses none of the objectionable features of the conventional mechanical tripping device, which under similar conditions, may shut down the unit completely.

● Main Reduction Gear

The double reduction Westinghouse gear reduces the speed from about 5100 revolutions per minute on the high pressure turbine and 360 r. p. m. on the low pressure turbine to 85 revolutions per minute on the propeller shaft at 3600 brake horse power. The turbines are connected to their respective pinions by means of a drive shaft having two couplings of the sliding type, one at each end of the connecting shaft. The gear housing is of fabricated construction and is provided with a large number of inspection openings to permit inspection of any important part of the gear with ease and convenience. All bearings are accessible for inspection, and may be rolled out after removing the bearing caps without disturbing any other parts. Each pinion bearing is supported on four pads with adjustable liners, to provide for proper alignment of the rotating parts of the gear. A Kingsbury propeller thrust bearing is mounted on the forward end of the main gear shaft.

The pinions are made from heat treated nickel steel, and the gear rims are made from forged low carbon steel.

By mounting the high speed gear wheels on the low speed pinions, between the two helices, the high speed pinions become very short and only two bearings are required for each pinion. The aft end of the high speed pinion driven by the high pressure turbine, has an integral flange which is connected to a motor driven turning gear. A sliding pin type coupling, operated by a hand wheel, is used to connect the turning gear to the pinion when in use.

Minimum weight of moving parts not being of primary importance, the gear wheels are made from cast iron having forged steel rims shrunk on and held in place by securely locked screwed pins.

● Main Condenser

The Westinghouse main condenser, which is of fabricated construction except for the water boxes, is hung between two longitudinal beams. These beams form part of the shell end flanges, and are further stiffened to an I-beam section by plates welded to the upper and lower edges of the beam. Such a design is, of course, practicable only where fabricated construction is used. The upper part of the condenser shell is so designed that it forms two transverse beams merging into the exhaust connection, and the whole structure thus forms an exceedingly rigid support for the forward end of the turbines.

The steam side of the condenser is of the radial flow type, and the cooling water makes two passes through the tubes, entering and leaving on the port side. The condenser, which has 4700 sq. ft. cooling surface, is designed to maintain a vacuum of 28¼ inches when supplied with 5750 gallons per minute injection water at 80 degrees Fahrenheit and condensing 28,500 lbs./hour exhaust steam. The hotwell has ample capacity and is of the deaerating type. It is specially designed to prevent steam and non-condensable gases in the condenser from entering the condensate pump suction when the level of the condensate is less than at the normal capacity of the pump. The tubes are rolled in the tube sheets at both ends and an annular diaphragm, placed between the periphery of the tube sheet and the shell flange, provides the necessary flexibility for expansion and contraction.

The Westinghouse air ejectors are of the twin, two-stage condensing type. The inter and after condensers use condensate only for cooling purposes and no salt water is used. Each set of air ejectors is provided with shut-off valves so that either side may be isolated.

The main condenser is served with cooling water by a Worthington circulating pump. Two Worthington condensate pumps serve the hot well.

The lubricating oil system includes: Two Northern Pump Company service pumps; one Gould manually operated service pump; two Davis Engineering Company lubricating oil coolers; one De Laval centrifugal lubricating oil purifier.

● Electric Light and Power Plant

Located on a flat on the port side of the engine room, the turbo-generators on these tankers will be 29 ft., 6 ins. above the base line of keel, or slightly above the loaded water line. Two General Electric 125 K.W. generators direct connected to General Electric turbines taking steam at 425 pounds pressure are installed for regular service. One 50 K.W. General Electric turbo-generating set is installed for emergency and pier side operation, taking saturated 200 pound steam. All wiring, switchboards, control boards, motor starting switches, motor control rheostats, light outlets, and fixtures will be selected and installed with the greatest care, in accordance with rigid specifications developed in the accident prevention work of the owners.

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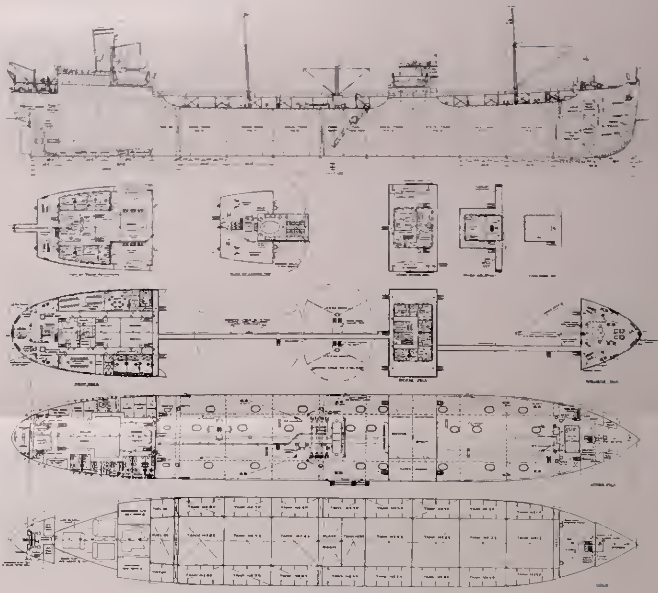
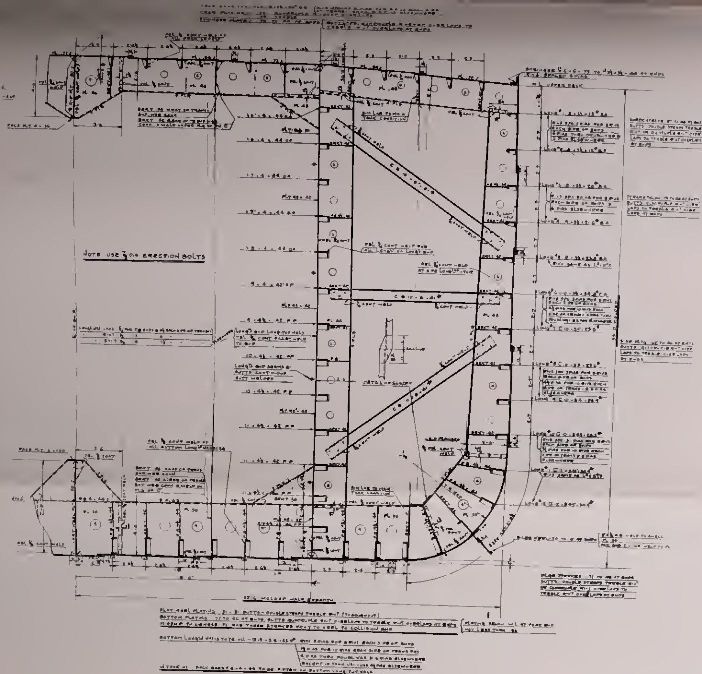


OUTBOARD PROFILE AND GENERAL ARRANGEMENT PLANS.
New Standard Oil Company of California Tankers now building at Sun Shipbuilding and Dry Dock Company.



Midship Section, New Tankers for Standard Oil Company of California

The corresponding flat on the starboard side of the engine room houses the work shop, which will be equipped with: one Rahn-Larmon engine lathe; one Sibley upright drill; one Steptoe Shaper; one Hisey Wolf floor type grinder; a work bench, and an ample supply of machinist's small tools. A Worthington air compressor and a Westinghouse Air Brake compressor and receiver take care of pneumatic requirements.

Pumps and other auxiliaries in the engine room, and not already mentioned, include: One evaporator feed pump; one fresh water pump of the portable type; one wash water pump; one sanitary pump; one fire pump; and two general service and ballast pumps; all of Worthington design and build.

One Davis salt water heater for the Butterworth tank cleaning system.

● Refrigerating Plant

The refrigerating plant is designed to maintain suitable storage temperatures in the ship's stores refrigerators and also to cool drinking water for the crew. The operation of the plant is by manual control except for the vegetable refrigerator. The temperature in this compartment is automatically controlled.

Refrigeration is supplied by two Carrier 2½ ton motor driven refrigerating plants of the direct expansion type. This equipment is generally similar to equipment being furnished by Carrier for other tankers now building.

● Deck Auxiliary Machinery

All deck auxiliaries are being built by the American Engineering Company to their own designs, modified by the owners to suit their special requirements. The steering gear is of the electro hydraulic type, and all of the winches and the windlass are steam.

As will be noted on the general arrangement, there are an unusual number of mooring winches, and a great deal of thought has been given to the location of these winches and the arrangement of fairleads, bitts and mooring pipes, so as to make an ideal layout for covering all the conditions met with in mooring at various ports. There are five mooring winches, each of which is really a small towing engine capable of adjustment, to set a predetermined strain on the hawser it serves.

Two cargo winches are installed forward to serve the two 5 ton booms fitted to the foremast. There are two 4 ton booms on a samson post at each side of the midship pump room hatch, and the mainmast is equipped to take either or both 5 ton booms if transferred from the foremast. Two samson posts with one boom each are installed on the poop deck house port and starboard abreast the forward end of stack, and two samson posts, with a two ton boom for each, on the poop deck aft of the house. This arrangement covers the entire ship with power lift facilities.

A warping winch amidships has ample capacity to edge the ship into line for shore oil line connections.

● Cargo Pumps

Discharge of cargo oil tanks is handled by four main and one stripping pumps, all of Northern Pump Company design and manufacture, and each driven by a Whiton steam turbine. All of these pumps are to be installed in the midships pump room. They will have a combined discharge capacity of approximately 12,000 barrels an hour at full rating, which is considered very ample for tankers of this capacity. The suction and discharge piping arrangements have been carefully considered, with the idea of eliminating all danger of contamination or mixing when tanker is used in the simultaneous transport of several different petroleum products.

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Above: Exhibit at the Sperry Gyroscope Company, showing new type of Gyro Compass, the two unit Gyro Pilot and other apparatus identical with the equipment for new tankers.
At right: The Mackay radio transmitter for new tankers.

Pumps—from Ancient to Modern Times

Pump head for deep well turbine for modern farm irrigation.

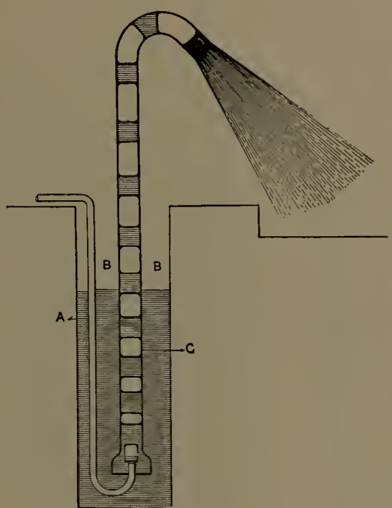
Part II—By E. L. Mathy

We have now left behind us the days of antiquity and are emerging into the transition periods culminating in mankind's greatest scientific and industrial achievements. Because our own company's pump building experiences and the universal interest of Western readers are centered so definitely upon the progress made on the Pacific Coast, it may not be amiss to begin this installment by recalling the early days of the Dons.

By the arrival of the nineteenth century, many of the now famous Spanish families lived their carefree and magnificent lives in the gorgeous country soon to become the thirty-first state of the Union. What lover of the lore of California will forget such names as De la Guerras, Ximenos, Estudillos, Carrilos, Estenegas, Morenos, Cotas, Estrades, Picos, Pachecos, Lugos, Ortegas, Alvarados, Bandinis, Peraltas, Rodrigues, Lopez, Figueroas, Vallejos, Martinez, Moragos, Sanchez, Avilas, Amestis and Castros.

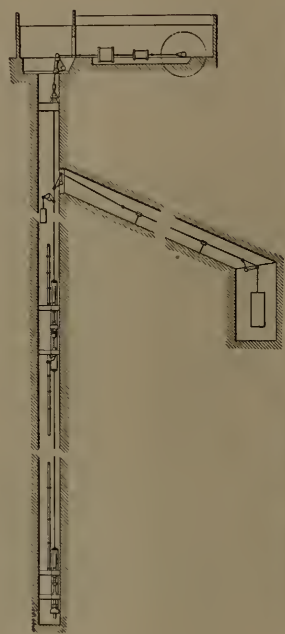
Fire pumps have been used since the earliest days of history, but not until 1830 is the first mechanically and steam driven fire engine designed and developed for the city of London by Braithwaite and Ericsson. This fire pump produced 150 gallons of water per minute and for a distance of some 80 to 90 feet. Approximately ten years later, this same Ericsson produced a similar pump for the city of New York.

In 1843 Captain John August Sutter founded his "New Switzerland" in the lowlands of the Sacramento Valley. His dreams were of an empire for himself and family, but soon a greater influence would bring vast fortunes to others but destruction to him. In January, 1848, Marshall discovered gold at Sutter's Mill, fifty



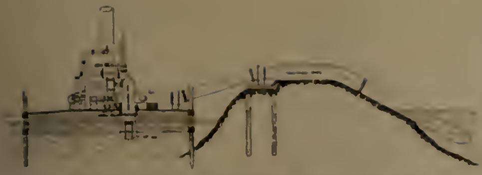
Air-lift pump.

Mr. Mathy is first vice-president, Victor Equipment Co. Illustrations of air lift pump and an early mine pump installation are reprinted by permission from "Pumping Machinery," by Greene, published by John Wiley & Sons, Inc.



Example of an early mine pump installation.

Krogh Water Elevator (1881).



Krogh reclamation pumping plant built for John Herd in February, 1899.

Krogh "horsepower" pump, called the "Monitor"—a triple geared farm pump of the late 90s.

miles in the foothills from Sutter's Fort—on the American River. Gold had been found before in California, but nothing would so stimulate the imagination of a people as the call—"GOLD—immeasureable quantities of gold have been found on the American River!"

The Gold Rush days have passed; the Vigilantes have restored law and order in San Francisco; but ever forward strides history.

On April 3, 1860, the first complete trip of the Pony Express left St. Joe. Nine days later, after 1500 miles of riding, in Washoe—Spafford Hall's Station, at the mouth of the canyon—in mid-afternoon, the Pony Express links the East with the West—records the greatest name in mining history—rides 500 miles further on to San Francisco. Established by Russell, Majors, and Waddell, the Pony Express operated first once, later twice, a week, with 500 horses, 200 stations, 100 riders, and a $5.00 postage minimum.

Sam Clemens had signed the name "Mark Twain" for the first time to a report in "The Territorial Enterprise," dated February 2, 1863—a year later Bismark becomes prime minister of Prussia, five years before Disraeli is appointed one of England's greatest prime ministers. The pen name "Mark Twain" was born in Washoe—a product of the Comstock. A year later the Comstock croppings would be skimmed—the mills would be in liquidation—water would be its principal undoing. March 21, 1864, President Abraham Lincoln signed the bill permitting Nevada to draw up a State constitution, and on October 31 he would proclaim it the thirty-sixth state of the Union. On April 11, 1865, General Lee had surrendered at Appomattox, and four days later at 7 a.m., the greatest man of the Republic had passed into history—he, of all men,—assassinated. In 1865, the Comstock was played out—literally drowned—drowned in the land of drought. Sutro's five mile tunnel was still an unfulfilled dream—a fantastical scheme. Not until July 8, 1878, did Sutro, stripped to the waist, witness the blast that broke the final barrier and connected the tunnel with the shaft of the Savage mine. Gould & Curry, Savage, Hale & Norcros, Challar, Potosi, Imperial, Kentuck, Yellow Jacket, Crown Point, Belcher, Consolidated Virginia, California, Ophir—these are the great names of the Comstock. George Hearst, Jim Fair, John Mackey, Jack O'Brien, Colonel Daniel Hungerford, and Adolph Sutro—these were the great men of the Washoe. Had suitable mining pumps been developed in the '60s, Sutro might not have been heard of—the Comstock might not have caused a panic.

Frederick Walter Krogh, a ship's carpenter, born in Denmark, came to New York, and sometime during 1857 arrived in California, where he engaged in agriculture in the area where would be established, in 1872, the now thriving town of Tulare. Sometime during 1864, Frederick Walter Krogh came to San Francisco and there started, on Beale Street, the F. W. Krogh Company, where he manufactured windmills and tanks. 1864 was a great year in San Francisco.

Norton the First, Emperor of the United States and Protector of Mexico, roamed the streets; the San Francisco Stock Exchange had been started a year previous. Kamehamacha IV died in the Hawaiian Islands; Lotta Crabtree, Woollcott, Menken played at the Metropolitan and Maguire's Opera House, and there was celebrated the 300th anniversary of Shakespeare with "Macbeth" and "Midsummer Night's Dream." The Bank of California, with a capital of $2,000,000 was started on June 15th, with D. O. Mills, President, and the famous W. C. Ralston, cashier. On September 3 the Fourth Mechanics Institute held its great show in a pavillion on Union Square with five hundred exhibitors—windmills being among the exhibits; its greatest attraction—a 4000-pound cheese. On January 11 of the following year the first Philharmonic Society concert was given at Platt's Music Hall, and the California Art Union was inaugurated. On the 21st day of January, the Camanche, the first and last iron-clad monitor constructed on the Pacific Coast, was built in San Francisco and made its trial trip to Mare Island with 200 guests.

This was the setting when Krogh came to San Francisco. Somewhat later his brother joined him and the firm then became known as F. W. Krogh and Brother.

Other great Western characters became famous in San Francisco—on October 2, 1866, Mark Twain delivered, at Maguire's Academy of Music, his first public lecture on "The Sandwich Islands;" Francis Bret Harte was elected librarian of the Mercantile Library Association. A month previous, the San Francisco Dry Dock was begun at Hunter's Point at a cost, exclusive of land, of $270,000. It might be noted here that the year of Mr. Krogh's arrival in San Francisco was that of one of the greatest droughts in California, with thousands of cattle and sheep dying because of lack of water and lack of food.

On August 23, 1875, began the second collapse of the Bonanza stocks, and the magnificent career of Ralston ended four days later.

In 1897 the Krogh brothers, then operating under the name of the Krogh Manufacturing Company, bought the San Francisco Tool Works, Inc., and formed the Krogh Pump Company. Among the interesting pumps manufactured by Krogh during this period was the

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Successful Sea Trials of

De Laval Geared Turbines Satisfactorily Pass All Tests

Main propulsion gear.

In April, 1936, Pacific Marine Review carried a full illustrated description of four sister tankers then building at the Sun Shipbuilding and Dry Dock Company for the Socony-Vacuum Oil Corporation and the Pan-American Petroleum and Transport Company, under the direction and to the designs of N. J. Pluymert, naval architect, of Socony-Vacuum Oil Corporation. The power plants on all four ships are identical.

The two ships for Socony-Vacuum, named respectively Mobilgas and Mobiloil, have been delivered after very satisfactory trial trips. In this article we are recording the results for the Mobilgas, which ran her sea trials on February 9 and was delivered on February 11. Principal dimensions of this vessel at time of trial trip were:

Length overall	501 feet, 7½ inches
Length—Lloyd's B.P.	485 feet, 6 inches
Beam molded	68 feet, 0 inches
Depth upper deck	37 feet, 0 inches
Draft	29 feet, 10⅞ inches
Deadweight capacity	15,515 tons
Displacement	21,350 tons

Her propulsion power plant consists of 2 Foster-Wheeler three drum, bent tube, type A steam generators, which are designed to produce steam at 450 pounds pressure and 720 deg. F. temperature at the superheater outlet. This steam is delivered to a cross-compound double reduction geared De Laval turbine designed for a normal rating of 4000 horsepower when receiving steam at 375 pounds pressure (gage) and 700 deg. F. total temperature, and when exhausting to a vacuum of 28¾ inches. The unit is designed to carry a 10 per cent overload continuously. This turbine must also operate satisfactorily with steam at 375 pounds pressure at temperatures down to 585 deg. F. At full load the high pressure turbine rotor turns 5480 revolutions per minute.

The propeller is of the four-bladed built up type, with semi-steel hub and manganese bronze blades of streamline section with variable pitch, designed to absorb 4000 horsepower at 75 revolutions a minute, and drive the hull at a sustained speed of 13 knots. This propeller has a tip diameter of 19 feet, 8 inches, a pitch of 18 feet, 4 inches, and 104 square feet of projected blade area.

That the turbines, propeller, and hull lines of this ship were designed truly for the specified performance is graphically shown by the results. The Mobilgas, properly trimmed, and down to her marks on full loaded displacement, ran 13.8 knots at 80.5 r.p m. propeller speed and with the turbine generating 4400 shaft horsepower.

Her fuel consumption works out at approximately 0.6 pounds of oil per brake horsepower hour.

The power plant is described in detail as follows:

The high pressure turbine is equipped with eleven pressure stages, the first of which contains two rows of moving buckets, while the remaining ten are single impulse wheels. The low pressure turbine has seven pressure stages, all of the single impulse type. The astern turbine, which is enclosed in the same casing with the low pressure turbine, has two pressure stages, each consisting of one wheel with two rows of buckets.

The turbine rotors are of the so-called "built-up" type; the high pressure rotor and part of the low pressure rotor consist of turbine discs shrunk on the turbine shafts, the low pressure rotor being built in three sections bolted together. This construction permits easy access to any individual wheel should any accident

Socony-Vacuum Tanker MOBILGAS

occur necessitating overhaul of the turbine.

All turbine wheels are made from heat-treated nickel steel forgings. The turbine wheels are each statically and dynamically balanced and the complete rotors are also subjected to static and dynamic balance in balancing machines prior to assembly in the turbine. The shaft and rotor are designed with their calculated first critical speed not less than 35 per cent above normal operating speed.

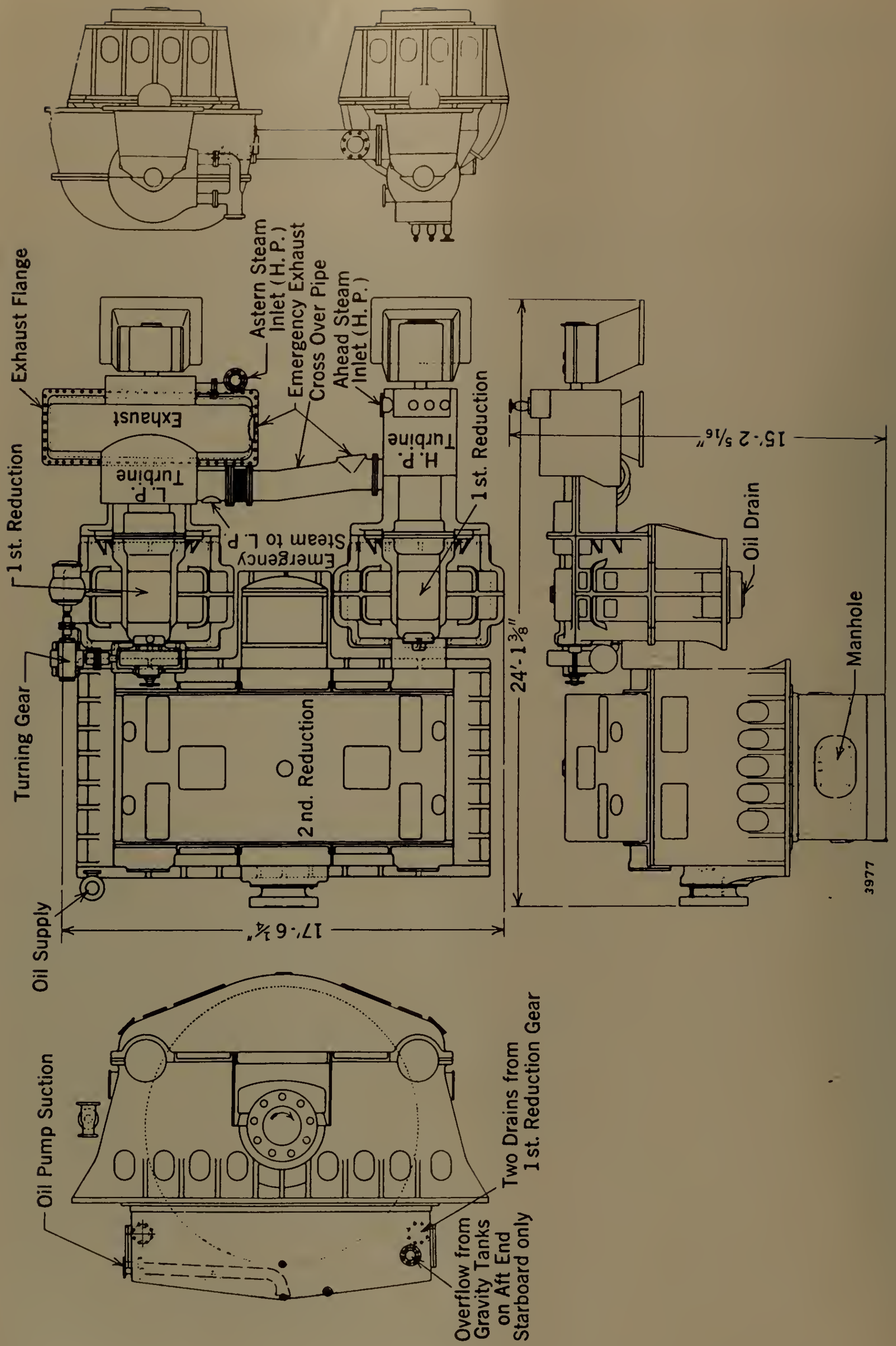
All stresses in the revolving element, that is, stresses in turbine wheels, turbine buckets, and bucket fastenings, are very conservative, and will not exceed one-third of the elastic limit of the material used when operating at 10 per cent above normal speed. The turbine rotors are held in axial position by Kingsbury bearings located in separate housings and provided with means for checking running clearances.

The casings of both the high and low pressure turbines are made of steel. The steam chest of the high pressure turbine is incorporated in the casing, but the steam chest of the reversing turbine is a steel casting located inside, but independent of, the low pressure casing, to allow for difference in expansion between the steam chest in contact with boiler steam and the casing in contact with steam at exhaust pressure. All steam passages are carefully streamlined.

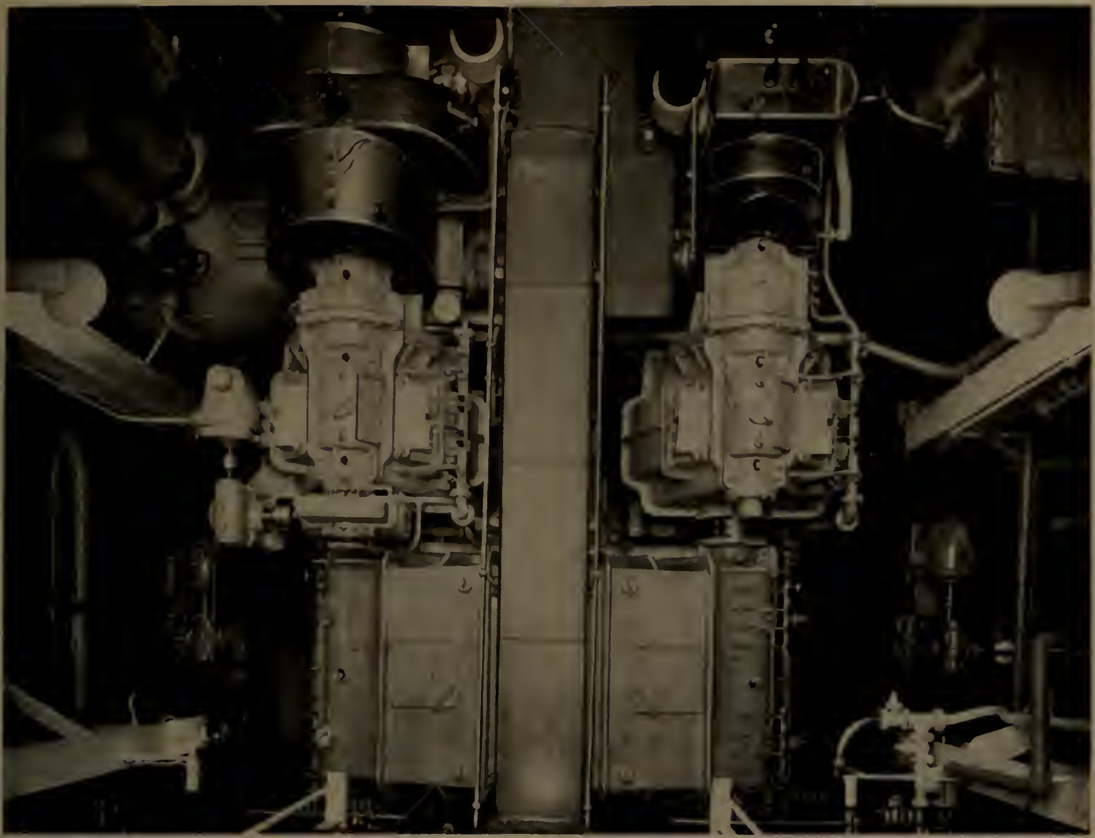
A group of guide vanes placed between the ahead and astern turbines in the low pressure casing, prevents impingement of steam exhausted from one turbine upon the buckets of the other and insures uniform distribution of steam over the condenser, which is located athwartship underneath the low pressure turbine. There is a connection on the turbine casing for the extraction of 2500 lb. per hr. of steam at 35 lb. gage for

Results of very satisfactory trial trips are described in this article based on the performance of the Mobilgas (illustrated above) and her sister tanker, the Mobiloil.

Below: Turbine-driven boiler feed pump on the Mobilgas. The power plants of four tankers built by Sun in Chester are identical.



General Layout of the De Laval Geared Turbine Installation on the Socony-Vacuum Tanker Mobilgas



Looking down on the De Laval compound turbine and double reduction gears of the Mobilgas.

use in feed heaters and for other ship purposes.

The astern turbine is designed to develop not less than 75 per cent of the full ahead power for continuous operation, and 100 per cent of normal ahead torque at one-half of normal ahead propeller speed.

The control valves include a valve for ahead operation, a valve for astern operation, and a guarding valve to assure against leakage through the latter. A regulating valve, placed ahead of the main throttle valve, is operated from a hydraulic governor driven from the high pressure turbine shaft and is adjustable to hold any speed from one-half of normal speed to full speed, and also arranged to close in the event of failure of lubricating oil pressure. There are, in addition, three hand valves for nozzle groups, so arranged that with the throttle valve full open various combinations of nozzles can be used to vary the power in small increments from 50 per cent of rated load to 10 per cent overload, thus making efficient operation possible at reduced speeds. All valves have steel bodies, with stainless steel trim.

The gears are of the double helical type with the two high speed gears and the double pinion low speed gear built in three separate casings.

The pinions of the low speed gear are supported by three bearings.

The turbine shafts are connected to the first gear reduction pinions and the pinions of the second reduction gears are connected to the gears of the first reduction gears by flexible couplings.

The tooth loading of the gears is conservative to insure long operating life.

The gear centers are of cast iron, shrunk and keyed on the shafts, while the rims are of annealed forged steel, shrunk and pinned on the centers.

The turbines and gears were tested at the De Laval test-room under full steam pressure and temperature, and to 15 per cent above the maximum operating speed before shipment.

In addition to the main propelling units, the ship is equipped with the following auxiliaries of De Laval manufacture:

Three six-stage turbine driven boiler feed pumps.

Main and auxiliary condenser circulating pumps, the main circulating pump being driven by a De Laval geared turbine.

Main and auxiliary condensate pumps.

Turbine driven fire pump.

Centrifugal sanitary pump.

Geared turbine to drive the general service pump.

Two De Laval-IMO lubricating oil pumps and a De Laval centrifugal oil purifier.

Marine Radio Auto Alarm

Mackay Equipment Exceeds Every Requirement oj the Federal Communications Commission

Mackay Radio and Telegraph Company is prepared for an active season, particularly in the production and supply of its model 101-A auto alarm. As shipping men are well aware, the Safety of Life at Sea Provisions pertaining to continuous watch are effective August 6, 1937, and require cargo vessels of 5500 gross tons or over, operating in foreign or intercoastal service, to maintain a continuous radio watch, either by means of three operators, or by one operator and an approved auto-alarm. In extensive tests conducted by the Federal Communications Commission to assure American shipping of a thoroughly reliable instrument, the Mackay Radio auto-alarm received the highest rating in performance of any authorized for use on American merchant vessels.

Ellery W. Stone, operating vice-president of Mackay Radio, states that his company is pushing production and is ready to meet orders with prompt installations.

It is interesting to note that the rigid specifications and requirements of our government were in excess of the requirements of foreign administrations. Extensive tests of the auto alarms submitted by the manufacturers were made by the U.S. Bureau of Standards, and thirty-day field tests were conducted by the U.S. Coast Guard at Fort Hancock, New Jersey. During that period the auto alarm was subjected to hundreds of response tests simulating actual distress signals in what is considered the most congested radio area in the world. Results of this test upheld the original design of the Mackay Radio alarm, for during the entire period no false alarm was recorded, and the Mackay Radio alarm now in production incorporates further refinements resulting from benefits gained through these exhaustive tests made by the U. S. Government.

The installation consists of two major units, a receiver and a selector, and it is designed for flexibility in installing and also for convenient maintenance. The two units may be mounted one above the other on a bulkhead or table, or even at right angles to each other should space limitations require.

The receiver is of the time-proven tuned radio frequency type. It utilizes standard parts and tubes, and this, of course, facilitates service replacements.

The selector unit, the heart of the alarm, is a device operated by a constant-speed motor which automatically selects signals appropriate to the International alarm signal and rejects all others. It is actuated when a signal of approximately four seconds duration is received, and, if this is followed by a one-second pause, certain relays make contact. If the pause is not followed by another four-second signal, however, the selector will reject the entire signal and return to its former state of watchfully waiting for an alarm.

Inasmuch as the auto alarm operates from storage batteries, it is not susceptible to voltage fluctuations in the ship's power supply and, therefore, to an erroneous sounding of the alarm bells. In the interest of preserving long life for the batteries, a low charging rate is used.

In the Mackay Radio alarm a special keying device transmits the international alarm signal automatically. This device keys either the main or the emergency ship transmitter by throwing a small switch on the front of the selector unit. This provides a continuous, accurately timed broadcast of the international alarm signal, and it does so entirely independent of the ship's power, and can do so in the absence of the radio operator. As a matter of fact, the ship could be abandoned and this equipment would continue to broadcast the alarm signals, enabling rescue ships to locate the vessel by means of direction finders.

The above illustration shows the Auto-alarm installed on the bulkhead of the radio room. Note the separate housing of the alarm unit and the radio receiver making installation possible in two different places where space is limited.

• • •

At right—View of alarm light and gong as installed on the bridge.

Trade Booklets and Bulletins

White Magic Ends Fear of Fire. An attractive 12 page color brochure, describing the Lux fire extinguishing system for airplanes, published by Walter Kidde and Company.

The safety equipment now being fitted to privately owned planes is identical to that installed on over 90 per cent of all modern transport planes. Lux carbon dioxide gas is stored in lightweight cylinders and discharged throughout the engine compartment by a simple remote control valve located on the instrument panel. The device bears the approval of the Board of Aviation Underwriters, and is widely used by various branches of the United States Government and many foreign governments.

Recent improvements include a new valve head, which lightens overall weight, and a reduction in price of single motor installation.

Walter Kidde and Company are represented on the Pacific Coast by Hough and Egbert, of San Francisco.

Type "C" Turbines for Mechanical Drive. Bulletin B. 2084, published by the Westinghouse Electric and Manufacturing Company, is a ten-page copiously illustrated booklet describing their line of steam turbines for driving general purpose machinery in industrial plants, and auxiliary machinery in power plants afloat and ashore.

These turbines are of the impulse type, with one pressure, and two velocity stages. They are built in capacities ranging from 5 to 500 horsepower at turbine speeds of 1000 to 5000 r.p.m. Designed for use with steam up to 650 lbs. pressure and 750° F. total temperature, they may be operated either condensing or non-condensing with rotation in either direction.

These units represent the result of 35 years of experience in design, construction and maintenance of mechanical drive turbines, covering units with a total capacity upwards of a million horsepower.

The Art of Proportioning. A 24 page illustrated booklet published by D. W. Haering & Company and describing the operation and application of proportioning equipment, with special reference to the Haering Fluid Piston Principle and its application in the introduction of chemicals for scale and corrosion control.

The Oxygen Lance. An 8-page booklet profusely illustrated with pictures and diagrams and published by The Linde Air Products Company. This booklet demonstrates the present status and the possibilities of the oxygen lance as a tool in industry.

Power Plant Measuring Instruments is Broadcast No. 160 of the Leeds & Northrup Company. It illustrates and describes their line of instruments, telemeters, and automatic controls for power plant use. Many specific installations are cited (including electrical generation and transmission, steam generation and distribution, hydro-power generation, and diesel power generation) that are using these equipments to safeguard operation and to effect operating economies.

Speed Affects Earning Power. A broadside setting forth the importance of measuring speed, published by the Hasler-Tel Company. It describes and illustrates the Hasler speed indicator and its application in the control of speed.

Flow Meters Electrical-Mechanical. Catalog 2004, The Brown Instrument Company. A gorgeous 56-page book in green, blue, and brown. Copiously illustrated, and with many tables and diagrams, it describes Brown's indicating, recording, integrating flow meters in the electrical or the mechanical types and their application to the various demands of industry and power generation.

Condenser Tubes. A beautiful art catalog in black and brown on tinted paper, published by the Scovill Manufacturing Company, this book describes the various processes of manufacture and the control of metallurgy that produce the Scovill condenser tubes. The full-page photogravure illustrations of actual operations in the plant are masterpieces of photographic art.

Marine Diesels. Bulletin 3700-D, published by Fairbanks, Morse and Company. This 30-page attractive booklet describes and illustrates the F-M Model 37 D marine diesel engine. Two sectional views in color, and many illustrations of parts, complete engines, and installations, show the advantageous features of this model.

The design features of this solid injection two cycle engine include oil cooled pistons, open head combustion, differential injection valves and back flow scavenging. It is manufactured in four cylinder sizes and is available in ratings from 250 horsepower up.

Something About the Bridgeport Brass Company. An interesting pocket size booklet of 12 pages bound in heavy stippled brass paper and giving a comprehensive sketch of the background, the history, and the products of the firm whose name it bears. Bridgeport Brass is one of the largest independent brass and copper mills in the U.S.A., and has a very interesting history.

Cruising Without Fear? A March, 1937, broadside published by Walter Kidde and Company, discusses protection from fire, with particular reference to small motor yachts.

By text and illustration it covers the relative values of portable equipment and built-in systems on pleasure craft ranging between 16 and 28 feet in length. It relates experiences on some of the 8,000 Lux-protected boats in this class.

The text treatment is non-technical, and is made very effective by illustrations. Cruising Without Fear? is recommended to all yachtsmen who wish to inform themselves on equipment available today for safe cruising.

Copies of any of these booklets may be obtained free by interested readers on application to Pacific Marine Review.

Industrial Relationship in Marine Industry

By Emmet J. McCormack

Vice-President, Moore & McCormack S. S. Co.

Industrial relationship between employer and employee administered and practiced with fairness to both is a vital factor in any big business.

New conditions bring new problems and in turn new solutions. American industrial leadership, which for decades has set the pace for the economic world in the satisfaction of human wants, is today redirecting its course. The new goal is the solution of a problem which in part it has helped to create, namely, that of better distribution and maintenance of purchasing power.

No fact is more evident among present day trends than the demand of industry and of the public for greater economic security for employees.

Management should be receptive to ideas from its personnel.

Ideas are the hubs and the spokes of modern industry. Almost every mechanical device is perfected through contributed ideas; short cuts in methods, policies of management, means of reducing operation costs or administrative expense, usually begin with a little idea efficiently applied. And these ideas may come from the most unexpected sources! The humblest employee may produce a suggestion of monumental significance! Hunting for ideas is like prospecting for gold—the most barren looking rock may hide the richest vein!

Executives know that their subordinates may discover ways and means of real value to the company. But these ideas rarely come to fruition unless they are definitely encouraged and sought for by the management.

● Inherent Obstacles

There are several inherent obstacles—an employee may lack confidence in his idea, or it may be only a germ which requires improvement. In any event the employee may fail to report it, fearing ridicule or indifference. Department heads may resist suggestions from subordinates, or may fail to give just recognition because the idea may reflect on them. Being mere humans, some officers hesitate to bring a promising subordinate into the limelight of official recognition, lest they jeopardize their own positions, which may be none too secure. Other department heads grab the idea and the credit too, but suggestions of value don't come their way very often, for no one likes to butter somebody else's bread.

And so valuable ideas lie fallow for lack of proper cultivation.

How, then, can fruitful ideas be made to penetrate this maze of impediments to official attention, and come to be examined without prejudice?

We have found the medium to be through the holding of safety meetings aboard ships and at our terminals.

The purpose of these safety meetings is three-fold:

1. To encourage and stimulate officers and crew to make suggestions calculated to be beneficial to the company.

2. To assure thorough consideration of, and prompt action upon, such suggestions for the mutual benefit of all concerned.

3. To promote better understanding and cooperative relationship between employer and employee.

The best service is only possible when the entire group is working in complete harmony. To obtain this very desirable result the company's safety program was inaugurated to inculcate into each employee a constructive attitude toward his job and toward his fellow men.

In the view of the management this attitude can best be developed and maintained if each employee has the proper attitude toward the company. He must feel and know that he is a part of the company. He must have a pride in his work and be contented.

We have operating on each one of our vessels a safety committee which meets at regular intervals and has as members generally the master, all department heads, and other officers who are not otherwise engaged. At times a member of the unlicensed personnel is invited to sit in. At these meetings accidents which have occurred are discussed and analyzed in order that proper measures can be taken to prevent recurrences; potential accidents are considered by recommending elimination of the hazards.

The minutes of these meetings are submitted to the safety director, and after perusal by the safety director, proper notations are made and he in turn submits his recommendations to the operating department for action.

In addition to the safety meetings held on vessels, the "shore staff" holds meetings whenever convenient in order not to interfere with the dispatch of vessels. At these meetings the marine superintendent, port captain, port engineer, port steward, dock superintendent,

receiving clerk, delivery clerk, general claim agent, stevedore and assistant stevedores are invited by the safety director, who generally presides. All activities in reference to personnel, loading and discharging, and recommendations pertaining to same are discussed, and all present are invited to express their opinions on subjects discussed. By this method we ascertain what the "other fellow" has in mind.

In the marine industry we must have cooperation from all of the men, who are vital spokes in a big wheel; if one spoke is weak our organization is weakened, with consequent loss of time, money, and sometimes even human lives.

It can thus be appreciated how our management has increasingly focused its attention upon plans to coordinate all parts of its organization so as to create a better spirit of industrial relationship.

● **Service Bonuses**

Longevity: In the marine industry one of the difficult problems confronting every owner or operator is the question of labor turnover. We believe that it is to our advantage if personnel of vessels remain as nearly permanent as possible. In order to encourage this permanency, so that both officers and men could look upon their ship as their home and so have pride in its preservation and success, we established a seniority list several years ago, and have paid longevity bonuses to officers and men based on their service with the company.

Fuel Conservation, in which the master and all the engine room force share pro rata. This bonus is paid to encourage reduction in fuel costs, which, as any steamship owner or operator knows, comprise a considerable part of the cost of a voyage.

Stores and Equipment, Repairs, Cargo, and Safe Navigation. This latter bonus is for the master only, and, I believe, tends to insure our vessels and cargoes against needless risks and recklessness.

In addition to the above, large sums have been spent by the management to install all practical safeguards for the protection of its employees. Much good has been accomplished, and out of the experience gained far greater possibilities for constructive measures have emerged.

Through our protective and indemnity insurance all men aboard our vessels have ample disability and sickness protection. Our shore workers and longshoremen are similarly protected by the Workmen's Compensation Law.

The future holds greater hope because of the knowledge gained from the mistakes and success of the past. We are supporting our experience by research and progressive action.

With the compass set toward better industrial relationship in the pursuit of marine safety, it is hoped that we may help to attain the goal of economic security for all concerned.

—National Safety Council News Letter.

Welding in Ship Construction

Since the adoption of iron as the principal material for use in ship construction there has been, with perhaps the single exception of the replacement of iron by steel, no such radical development in the art of shipbuilding as the introduction of electric welding.

Beginning with the welding of small and relatively unimportant parts and details, the welding art, as applied to ships, has progressed today to the point where it embraces the entire hull structure of many small vessels, and it appears but a matter of time when it will nearly, if not entirely, displace rivets in the construction of ships of all sizes. There are still obstacles in the way of the attainment of this end, but the rapid development which has taken place during the past few years gives promise, at the very least, of a very wide expansion in the use of welding.

In the field of marine engineering, welding has not kept abreast of the progress made ashore, particularly in power plants. This may be accounted for by two facts—first, the very proper and entirely legitimate conservatism of the marine engineer in all matters which affect the safety of a ship and her passengers and crew; and, second, the fact that the necessary crowding machinery on shipboard, as compared with what ob-

tains ashore, makes necessary the fitting of bolted joints in pipes and fittings in order to get access to other parts during overhaul.

The permanent strength and efficiency of a welded joint depends mainly upon two things: The skill of the welder, and the stress relief of the joint after the welding is completed.

Of the possibility of making welded joints having practically the same tensile strength as the material welded, there can be no doubt. The welders' tests conducted by the Bureau give abundant proof of this. While doubt has been expressed in some quarters as to the relative shearing strength of welded joints, it appears probable that any deficiency in this respect is due to stress conditions in the material immediately adjacent to the weld rather than to any defect in the weld itself. It is this condition of stress in the parts joined by the weld that makes necessary the second essential for successful welding: stress relief or annealing.

The most superficial consideration of the physical conditions under which a weld is made makes clear the fact that any weld induces a certain amount of stress in the material which surrounds it, due mainly to the very high temperature and consequent expansion at the point of fusion.

Up to the present time, this Bureau has been concerned with welding mainly in its application to the building of boilers and the assembling of low pressure piping systems.

In this country, the building of fire tube boilers of the Scotch type has practically ceased for marine work, with the result that plate work for boilers, aside from casings, air ducts, and similar non-pressure parts, is practically confined to the steam and water drums of water tube boilers. These are now almost universally welded and give entirely satisfactory service at the highest pressures. Their structure is such that the welds can be examined by X-ray and annealing made complete and thorough.

This interesting picture shows 3 electric arc welders working on the bottom of an all welded new motor vessel at the Rouge River plant of the Great Lakes Engineering Company. The hull is 300 feet long, 43 feet beam, and 20 feet depth. It is being built for Great Lakes and Atlantic seaboard service through the New York State Barge Canal.

For the use of this picture we are indebted to the courtesy of the James P. Lincoln Arc Welding Foundation.

For piping systems, welding on shipboard has not kept pace with stationary practice where welded pipe and fittings are being used for pressure of 1,000 pounds and over and steam temperatures of 800° or more. Such pressures and temperatures have not yet been reached in marine work, except in a very few more or less experimental installations and, for various practical reasons, it is somewhat doubtful if they ever will become "common practice" on shipboard.

For one thing, both pressure and temperature conditions in a power house steam line are not in general subject to the relatively frequent and wide variations which marine piping of corresponding type is called upon to withstand, and, in consequence, are less stressed. Again, the welding of an entire steam line from boiler to turbine, as is now being done ashore, presents very great practical difficulties when applied to marine work, not the least of which is the absence of bolted flange joints, as has already been mentioned. Certain marine engineers of recognized ability are advocating the use of welded joints in piping to the practical exclusion of bolted flanges, while others of equal ability and experience are inclined to go ahead very cautiously.

Whatever the extent to which welded piping may ultimately be adopted in marine installations, there can be no doubt as to its early use in certain piping details, as, for instance, the butt welding of forged steel flanges to piping for all practicable pressures and temperatures. This form of joint is a most excellent one, and has been thoroughly tested by long service ashore. Moreover, it can be examined by X-ray and thoroughly annealed without great difficulty.

This Bureau proceeded cautiously in the matter of welding boilers and pressure vessels and is pursuing the same course as regards piping. It has been criticized in some quarters for over-conservatism, but the same criticism may apply to the classification societies and, we believe, to the majority of marine engineers. However, thanks to the progress made in the past two years, the welding of high pressure piping can no longer be considered as in the experimental stage.

The Bureau has been cooperating, for some time past, with the American Welding Society in the formulation of a welding code for marine installations. While this code is not yet complete, it is in effect so far as boilers and pressure vessels are concerned. It is expected that the complete code, covering all types of welding, as applied to boilers, pressure vessels, piping and pipe fittings, will be completed and put in effect in the near future.

Bulletin, Bureau of Marine Inspection and Navigation.

Ship Design and Marine Insurance

(Continued from April Issue)

This series of articles is an abstract of papers prepared on this subject by Dr. E. Foerster, of Hamburg, and appearing in The Marine Underwriter. The first installment (April Pacific Marine Review) considered the structure of the ship's hull and the strains and stress to which that structure is subjected in use at sea, and indicated that the risks of damage and total loss to the hull are of four general types: stranding, collision, heavy seas, and fire. At the close of that installment we had reached the decision of the author that twin screw sterns were less likely to be badly damaged by stranding than were those fitted for single screws.

The forms of rudders best adapted to escape damage in stranding are also best adapted to twin screw stern construction.

Certain bow forms very much lessen the risk of great damage in stranding.

After stranding, a very careful inspection should be made of the entire hull so as to detect any internal injuries or any damage to the upper decks and superstructures.

● Collision Considerations

A whole series of collisions has demonstrated the value of the raked stem, the old sailing ship type of bow, and the Maierform, in minimizing damage to both the ramming and the rammed hull. In most cases of collision with such bow forms the force of the impact is expended in crumpling the above water part of the bow of the ramming ship while penetrating the above water part of the rammed hull. The ramming hull with bows of these types seldom sustains damage aft of the collision bulkhead, and seldom is the forepeak fully flooded. The rammed hull very seldom floods even one compartment.

A straight stem with an underwater bulb (the bulbous bow) is very dangerous as a ramming device, and will cause great damage below the water line. The well-rounded bilge (as in the Arcform hull) has a tendency to minimize damage in the case of being rammed by another hull. Large passenger vessels are now built with inner skins forming waterproof cofferdams along the sides. These cofferdams are subdivided and may be used as tank space for water, oil fuel or other liquids. When carried up to the bulkhead deck they form an ideal protection against dangerous damage from collision.

It is the author's conviction that a sensible evolution of the design of hulls to include these longitudinal double skins, or cofferdams, throughout the length of passenger vessels is of far greater importance, from the safety at sea point of view, than further multiplication of transverse water tight bulkheads.

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

Bids in on New Ship

Tanker construction is still the sole commercial outlet for the energies of the American shipbuilder in producing seagoing merchant tonnage.

However, with the new Maritime Commission beginning to function, that picture will change rapidly and we will see many proposals for ships of various types.

First experience of the new commission in actual bids for ships was the opening, on April 1, of the tenders for construction of a vessel to run in transatlantic ferry service with the Manhattan and the Washington. There were only two of these bids, which was somewhat of a disappointment to the commission.

Although only one ship was intended to be built under these bids, the specifications and plans issued called for bids on each of two types. One type was substantially a duplicate of Manhattan and Washington; the other was a somewhat larger vessel, designated as Type K.

For the two designs the main dimensions are:

	Manhattan	*K design*
Length overall	705 feet	719½ feet
Beam molded	86 feet	92 feet
Draft	30 feet	32 feet
Speed	22 knots	22 knots
Passenger capacity	1102	1143

Both designs include all the latest safety and national defense features as required by the Merchant Marine Act and the rules of the Marine Inspection Bureau.

Each of the shipyards tendering bids submitted a bid on an alternative design of its own, equivalent to the K type design. The bids were as follows:

	M-W Design	*K Design*	*Shipyard Design*
Newport News Shipbuilding	$14,375,000	$15,455,000	$14,560,000
New York Shipbuilding	$14,995,000		$15,665,000

Both yards stipulated that these quotations are good only until May 1.

Of great interest to shipbuilders and shipowners, in connection with these bids, is the great rise in costs during the past seven years. The Washington and the Manhattan, built at the New York Shipbuilding Company's yard and contracted for in 1931, cost $10,500,000 apiece. Now the cost seems to have advanced approximately 40 per cent. This may be accounted for in several items. Labor costs have greatly increased, and there is much uncertainty about the future and present demands of organized labor. Material costs have advanced, and there has been a very decided increase in the requirements in safety devices, communication systems, fireproofing, and other equipment features.

Old Government Vessel to be Converted

Plans are under way by the Shaver Transportation Company, Portland, Oregon, for modernization of the former Government survey boat George H. Mendell. She was purchased from the Government last November, and will be converted to a motor tug by the installation of a new 480-horsepower Atlas Imperial diesel motor this spring. Built in Portland in 1889, she was rebuilt in 1912. The original steam engine will be removed for the installation of the diesel engine. After completion, the Mendell will be employed in towing log rafts and barges.

New Sardine Seiner

At the plant of the A. B. Anderson Shipbuilding Corporation, Seattle, Washington, a new sardine purse seiner was scheduled for completion on April 15 for Chris Jangard and associates.

No name has been selected for the new boat, which will have for her motive power a four-cylinder 200 horsepower Cooper-Bessemer diesel. Molds for the seiner were laid the middle of December. She will have an overall length of 77 feet and a breadth of 20 feet 5 inches, states A. B. Anderson.

Plans were drawn by J. M. Martinac, well known Tacoma purse seiner builder, and these plans show that the craft will be a refined edition of the seiner Oceania, built by J. M. Martinac last summer. Her cost, not including diesel or electrical equipment, has been figured at $23,000.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401)**; completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341′ 3⅝″; beam, 35′ 6⅛″; depth, 19′ 8″. Cost $3,675,-000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; completion date July 24, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Capac, Condor, Sutherland, stm. sch. Chehalis, Dorothy Alexander, City of Los Angeles, Democracy, Santa Paula, stm. sch. Florence Olson, U.S. dredge A. Mackenzie, Charcas, Coya, Admiral Williams, Chiriqui, Admiral Nulton, President Coolidge, W. F. Burdell, Mu-nami, H. M. Storey, President Polk, Antigua, Roseville, Talamanca, Richmond, fire boat David Scannel, Matsonia, M.S. Charlie Watson, Losmar, Santa Elena, Enterprise, Hanley, W. E. Hutton, M.S. Fosna, U.S.S. Maryland, Anna Schafer, M.S. Adelian, Santa Rosa, Manulani.**

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION: **4 keels laid July 6, 1936, Fellows Craft stock cruisers 30′ x 8′ x 2′6″, powered with Kermath Sea Flyer 6-cylinder 85-H.P. engines with 2 to 1 reduction gears.**

Five 32 ft. W.L., 46 ft. O.L. One design sloop yachts; auxiliary power, with small h. p.

One 60′ high-speed glass bottomed sight-seeing boat powered with twin Hall-Scott marine motors. **Delivery date, May, 1937.**

One 40′ sport fishing boat, twin screw, Kermath gas engines.

DRYDOCK AND ROUTINE REPAIRS: Yachts Portola, Zahma, Corsair, Cheerio II; forty-one other yachts and power boats for routine overhaul and maintenance work.

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Catherine Sudden, U.S. dredge A. Mackenzie, Golden Fleece, Santa Monica, gas. s. California Rose, gas s. Dux, Manatawney, U.S. cutter Golden Gate, U.S. tug H. M. Adams, Lumberman, Mericos H. Whittier, Arctic, gas. s. Marettimo, W. R. Chamberlin, Jr., Barbara C, dredge Long Beach.**

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80′ U. S. Coast Guard patrol boats; 1,600 H.P. each**; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; estimated launching, May, 1937; expected completion, August, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: **President Taft, Steel Inventor, Steel Seafarer, Silverlarch.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: **S. S. Gargas; whaling vessels of American Pacific Whaling Co.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Forest King, Lawrence Philips, G. B. Pico, yacht Serena, M. V. Minowo Maru, tug Louie Black, Santa Maria, Emergency Aid, m.v. Velma, m.v. Nordanger, m.v. Nordbo, f.b. Portola 1, Siskiyou, Golden Dragon, g.p. Barge No. 1.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Glymont, Hamakua, Jacox, Hawaiian, Tejon, Seattle, Santa Fe Barge No. 6, Dauntless, Coloradan, Kewanee, Helen P. Drew, Ludington, Roseville, Oklahoman, Louisianan, Anna Schafer, S. C. T. Dodd, Alaska Standard, Glacier, Montanan, Standard Oil Barge No. 95, dredge San Joaquin, Rheems, Arizonan, San Leandro, Sun Maid, American Fisher, Tahoe, G. W. Walden, yacht Zaca, Sacramento, Dispatch No. 6, Standard Tug No. 1, Wallingford, Lake Miraflores, Dakotan, Silverado, Hercules, Golden Cross, Bengalen, Tosari, Frances, Paterson, Water Barge YW 30, Chirikof, Virgil G. Bogue.**

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: **Snagboat Essington, Prince Charles, 3 scows, 12 motor vessels, 39 ship repair jobs not requiring docking; 40 commercial jobs.**

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 23, 1935; estimated completion date, September 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935, estimated completion date, October 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Tennessee, Oklahoma, Louisville, Eagle 57, Samuel D. Ingham, Cushing, Perkins.**

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Keel laying begun for ten 36′ and ten 29′ stock keels.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: **Golden Kauri, Oduna, Lakina, Starr, Mathew Luckenbach, Susan V. Luckenbach, Point Clear, Sacramento, David W. Branch.**

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley**, Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); keel laid January 14, 1936; launching date, March 11, 1937; estimated delivery, October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery, July, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: Elliot, Hopkins, Dorsey, Grebe, Dahlgren, Overton, Milwaukee, Ramapo, Koka, Pensacola, Eagle No. 32, Narwhal.

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 124, purse seiner; 72' x 18'; keel laid March 3, 1937; powered by Atlas 135 H. P. engine. Owner, Nick Mardesich, Everett, Wash.

Hull No. 125, purse seiner; 72' x 18'; powered by Atlas 135 H. P. engine. Keel laid March 10, 1937. Owner, John Bocaka, Everett, Wash.

Hull No. 126, purse seiner; 76' x 20'; powered by Washington 200 H. P. engine. Keel laying date, April 20, 1937. Owner Peter San Felippi, Monterey.

Hull No. 127, purse seiner, 82' x 20'; 200 H.P. Atlas engine. Owners, Ed. & J. Kaseroff and E. Manaka, of San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: Tacoma Tug and Barge scow No. 10; fishing boats Excellent, Commander, Tacoma, Valencia; Chimacum.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION: 3 dump scows 114'x26'x7'9".

Six barges, 196' x 34' x 8', for Barrett Line, Inc., Cincinnati, Ohio.

One oil barge, 145' x 26' x 7' 4" for Standard Oil Co. of Ohio.

DRYDOCK AND ROUTINE REPAIRS: 20 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Hull No. 915, Four yard dipper dredge;** length overall 110'; breadth molded, 40'; depth molded, 8'; steel house 84'x24'x 10'3" high; no living quarters. Designed for maximum bridge clearance of 15', which requires a frame and stack to be collapsible. Scotch boiler 13' diameter by 12'10" long; 160 lbs. pressure. To be built at Buffalo. Keel laid December 20, 1936; estimated launching date, March 1, 1937; delivery date, May 1, 1937.

2 bulk lake freighters 610'x60'x32'6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis** and **DD396 Jouett;** Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396,** keel laid, Mar. 26, 1936. **DD395,** keel laid July 28, 1936. **DD394,** keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and **DD410, Hughes,** two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 172, "J" class sloop for Mr. Harold S. Vanderbilt; delivery date, May 11, 1937.

Hull No. 173, Winchester, single screw, diesel propelled trawler for Boston, Mass., owners; delivery date May 15, 1937.

Hull No. 174, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, June 1, 1937.

Hull No. 175, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 176, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

DD-380, Gridley, 1500 Ton Destroyer. Keel laid June 3, 1935; launched December 1, 1936 estimated delivery, May, 1937.

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; launched February 25, 1937; estimated delivery, June, 1937.

CV7, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; estimated delivery February 1, 1938.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil Tankers**—steam—425'x64'x34' for Gulf Refining Co.; total tonnage 7070 each.

Two 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots. Total cost for both vessels will be $4,000,000.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel towboats** of 550 H. P. each, for private parties. Delivery dates June 1, 1937, and July 1, 1937.

One 90' all-welded diesel tug for the Red Star Towing Co.; delivery date, May 1, 1937. 750 horsepower.

One all welded steel oil barge for the Barrett Co.; 97'x25'x10'; estimated delivery date June 1937.

DRYDOCK AND ROUTINE REPAIRS: Reconditioning tug Jupiter; drydocking and overhauling tug S. E. Carroll; overhauling fleet of tugs and barges for W. E. Hedger Transportation Co.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

DRYDOCK AND ROUTINE REPAIRS: U. S. snagboat Wateree; oil barge; yachts Cananova, Venturer, Osprey; dredge Cherokee; tug Lockwood.

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

One 73' cruiser, 2 Speedways; delivery date, June 1, 1937.

One 65' cruiser, 2 Speedways.

One 42' play boat, 2 Kermaths; delivery date, May 15, 1937.

One 42' play boat, 2 Kermaths; delivery date, June 1, 1937.

One 39' play boat, 2 Buda diesels.

One 39' play boat, 2 Chryslers.

One 20' yacht tender, 1 Kermath delivery date, May 1, 1937.

Two 39' play boats for stock.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One lighthouse tender, Elm, 72' 4" 17' 0" x 6' 6", for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

One diesel yacht, powered by 1,000 h.p. Winton engines; 143' long, 2? beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997** one diesel sternwheel towboat of 91 gross tons.

Hull No. 1299; one self-propelled diesel pipe line dredge Rock Island, for U.S. Engineers, St. Paul; 1987 gross tons.

Hulls Nos. 1324-1327, inclusive; four welded flush deck cargo box barges 100' x 26' x 6'6"; 660 gross tons.

Hulls Nos. 1357-1358, inclusive; two welded type W-3 coal barges 175' x 26' x 10'8", for stock; 944 gross tons.

Hull No. 1368; one welded steel oil barge 175' x 26' x 10'8"; for stock; 472 gross tons.

Hulls Nos. 1370-1374, inclusive; five welded flush deck cargo box barges 130' x 34' x 10', for Warner Equipment Co., Philadelphia, Penn.; 2260 gross tons.

Hulls Nos. 1375-1378, inclusive, and 1384, five welded steel deck barges 80' x 30' x 9', for Pennsylvania Railroad, Phildelphia, Penn.; 885 gross tons.

Hulls Nos. 1380-1383, inclusive; four type W-3 welded coal barges 175' x 26' x 10' 8"; for stock; 1888 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hull 1387; one riveted steel coal barge 170' 2" x 40' 2" x 17', for Oliver Transportation Co., Philadelphia, Pa.; 100 gross tons.

Hulls Nos. 1388-1412, inclusive; 25 welded steel coal barges 140' x 26' x for Wheeling Steel Corp., Wheeling, West Va.; 8875 gross tons.

Hulls Nos. 1415-1424, inclusive; ten welded type W-3 coal barges 175' x 26' x ...'; for stock; 4720 gross tons.

This makes a total of 61 hulls with total gross tonnage of 24,202 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 6, 1936.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 5, 1936.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936.

Hull No. 29, Sargo (SS188); estimated keel laying date, April, 1937.

Hull No. 30, Saury (SS189); estimated keel laying date June, 1937.

Hull No. 31, Spearfish (SS190); estimated keel laying date August, 1937.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, **DD381 Somers and DD383 Warrington**: keels laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May, 1937, respectively.

Three destroyers, **DD397 Benham, DD398 Ellet and DD399 Lang**, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Sherwood Arcform design of hull form and longitudinal hull framing; keel laid, Hull 143, Decemer 16, 1936; Hull 144, February 8, 1937.

Two destroyers, DD411 and DD412.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

Six steel cargo barges, stock type, for carrying petroleum products in hull or for heavy deck loading, for John I. Hay Co., Inc., Chicago, Ill. Being built at Decatur, Alabama, yard. Launching dates March 22, March 29; April 24, 28, 30. Delivery dates April 10 for May 10 for remaining 4.

One 50' steel barge; 2 60' steel barges, U.S. Engineers Office, Savannah, Ga., 50 x 18 x 4'; 60 x 18 x 4'; launching date April 10; delivery date May 10.

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8'. Probable launching date September 21; delivery date, approximately Oct 15.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all-welded steel diesel tugboat; 64' 11" long, beam molded 18', depth molded 7' 9"; equipped with 380 H.P. Atlas Imperial engine; for Pan American Refining Corp., New York City. Delivery date, July, 1937.

One all-welded steel petroleum barge; 173' x 39' x 8'6"; for Pan American Refining Corp., New York City. Delivery date, May, 1937.

One all-welded steel diesel tugboat; 74' long, beam 19', depth 9'; equipped with 380 H.P. Atlas Imperial engine; for Higman Towing Co., Orange, Texas. Delivery date, June or July, 1937.

One all-welded steel petroleum barge; 156' x 34' x 9'; for Higman Towing Co., Orange, Texas.

One twin screw diesel electric all-welded steel automobile and passenger ferryboat; length overall 149', beam over guards 66', depth molded 11'; equipped with two 6 cyl., 350 H.P. Cooper Bessemer engines. Delivery date, May, 1937.

DRYDOCK AND ROUTINE REPAIRS: Reconditioning and installations U. S. Lighthouse tender Larkspur. Installing new boilers and conversion from coal burner to fuel oil system.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank steamer**, 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated launching date, July 15, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION:

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. Keel laid December 9, 1936; launching date, April, 1937; delivery date, June, 1937.

Four steel landing barges for the Wheeling Steel Corp., of Wheeling, W. Va.; 90' x 18' x 5'; two equipped with electric winches; two with hand capstans.

One steel derrick boat hull, 66' x 40' x 5' 9"; for stock.

Ten steel coal barges, 175' x 26' x 11'; for stock.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **Three steel carfloats**, 250' x 34' x 9'; for the Pennsylvania Railroad; delivery dates, one in May, 1937; two in June, 1937.

DRYDOCK AND ROUTINE REPAIRS: U. S. Army dredge Navesink, City of Hamburg, Waukegan, Northland, Southland, District of Columbia.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359 aircraft carrier CV5, Yorktown, for U. S. Navy**; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6".

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launching date, August 1, 1937; delivery date, September, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280' x 48'6" x 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

DRYDOCK AND ROUTINE REPAIRS: Rebuild Scow 8 for City of Baltimore; Tugs Wrestler, America, Britannia, M. Mitchell Davis.

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, two steam

tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, August, 1937; delivery date, September, 1937. No. 162, launching date, January, 1938; delivery date, February, 1938.

Hulls No. 163, 164, and 165, three diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launching date, July, 1937; delivery date August, 1937. No. 164, keel laid December 15, 1936; launching date, January, 1938; delivery date, February, 1938. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; delivery date, September, 1938.

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION:

1 derrick barge 100' x 44' x 6' for U. S. Engineer Office, Vicksburg, Miss.; delivery date, July, 1937.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD384, U.S.S. Dunlap, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched April 18, 1936; estimated delivery, May 21, 1937.

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, July 23, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching, May 7, June 4, and July 2, 1937, respectively; estimated delivery, August 3, August 24, and September 14, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 27, May 11, and June 8, 1937, respectively; estimated launching, August 17, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6". Keel laying date, June 8, 1937; launching date, July 20, 1937; estimated delivery, July 26, 1937.

CRANE PLANT
27th Street, Brooklyn, N.Y.

Hull No. 849, ferryboat **John J. Walsh**, for the Westchester Ferry Corp., Yonkers, N.Y. LOA 153', beam, extreme, 48', depth 14' 6". Estimated keel laying, April 27, 1937; estimated launching, June 22, 1937; estimated delivery, July 27, 1937.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19'8"; estimated delivery indefinite.

Order placed for **DD415, O'Brien**, and **DD416, Walke**, two destroyers; delivery dates, August, 1939, and October, 1939, respectively.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn**, light cruiser, L.I P. 600'; beam 61'8"; standard displac ment, 10,000; geared turbine engine express type boilers; keel laid, Marc 12, 1935; launched November 30, 193 estimated delivery, November 1, 193

CL 48, **Honolulu**, light cruiser; L.I P. 600'; beam 61'8"; standard displac ment 10,000; geared turbine engines express type boilers; keel laid Septen ber 10, 1935. Estimated launching i definite; estimated delivery, May 1938.

CL 50, **Helena**, light cruiser; L.B. 600'; beam 61'7¾"; standard displace ment 10,000; geared turbine engines express type boilers; keel laying, De cember 9, 1936; launching indefinite contract delivery, May 16, 1939.

DRYDOCK AND ROUTINE RE PAIRS: **Mahan** arrived Jan. 15, 193 for preparation, final trials, and com pletion of work, Estimated completio May 25. **Reid** arrived March 1 for pre paration, final trials, and completion o work. Estimated completion June 24. **Cummings** arrived March 29 for dock ing, preparation for final trials, an completion of work. Estimated comple tion, June 29.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for one harbor tug LOA 124' 9", length between perpen diculars 117', breadth, molded, 28 depth, molded, 16'.

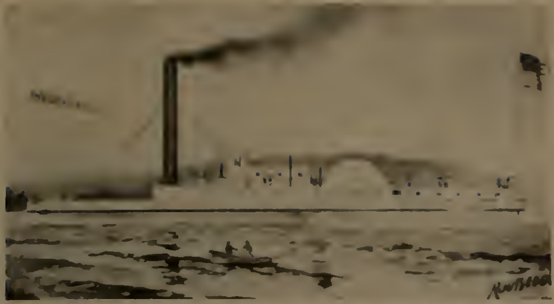
UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61 9¾", depth molded at side to main dec amidships 42'0 3/8", draft correspond ing to normal displacement 21'10", standard displacement 10,000; estimat ed completion January 1, 1938.

(Continued on page 60)

Port of Portland Notes



Steamer Lot Whitcomb, built at Milwaukee on the Willamette in 1850 for Columbia River trade. Later named Annie on the Sacramento River. Illustration made from an old print in Lewis and Dryden's Marine History of Pacific Northwest.

Portland and the whole trading area served by the Columbia River Gateway are preparing to join with the rest of the nation in the annual observance of National Foreign Trade Week, May 16 to 22, inclusive, in a big way.

Groups active in promotion of foreign trade have pooled their efforts and influence to make the week this year more noteworthy than ever before. Portland Chamber of Commerce, Columbia River Gateway Foreign Trade Association, Portland Shipping Club, Portland chapter of the Propeller Club of the United States, and Columbia Empire Industries, Inc., head the parade.

While the Chamber of Commerce gathered up ship models throughout Portland and prepared to place them in vantage points in display windows throughout the city, the Foreign Trade Association took active leadership in cities outside of Portland.

Portland Shipping Club chartered a river steamer for the purpose of operating a series of informative and instructive harbor excursions to make it possible for Portland people to see the docks and ships that make up their port.

The Propeller Club and Columbia Empire Industries, Inc., sponsored high school contests, the former a poster contest, the latter an essay contest, with money prizes offered to winners, to bring home to young people the importance of foreign trade.

● Foreign Trade Grows.

Return of good days to the Port of Portland brought back wheat and flour shipments to Europe, lumber shipments to the Orient and South Africa, scrap metal shipments to Japan, and a spurt at the end of the fresh fruit shipping season.

The first wheat to be loaded for Europe since prior to the latest maritime strike went into the holds of the Dutch motorship Damsterdyk, April 17, and was to be followed by a movement of close to 30,000 tons reported booked for the Continent, largely to Rotterdam.

A number of foreign bottoms were under charter to load logs, lumber and piling in the Columbia River and Coos Bay for Japan and China during the second quarter of the year, while several liners took large shipments of lumber for South Africa delivery.

The season's apple and pear exports were considerably bolstered during the last month of the season when several refrigerated ships loaded heavily in Portland and Seattle. German vessels took the heaviest shipments for the continent, a total of about 200,000 boxes on four vessels, while the American Reefer, Danish, finished the year's schedule of sailings for the eastern Mediterranean region.

● Customs Receipts Set Record.

While exports climbed, imports also climbed during March and April. March, in fact, set a new record for Portland customs receipts when Uncle Sam collected \$305,000 in duties on goods unloaded in Portland.

April started well in this regard, with heavy importations of Argentine corn, linseed, and corned beef leading the field.

● Steamboat Veterans Plan Meet.

Planning far ahead of the annual reunion and picnic of the Veteran Steamboatmen of the West, Captain Arthur Riggs, master of the organization, has announced that the picnic will be held in a Vancouver, Wash.,

Left to right: Old Pacific Coast steamer Admiral Evans being cut up for scrap. Mountains of steel scrap awaiting shipment to Japan. Ships of the world loading lumber and lumber products at Portland.

An interesting view of M.S. Feltre discharging cargo after being raised and towed to Portland. Note extent of timber cofferdam alongside of ship.

park June 27, and that the memory of the old steamboat Lot Whitcomb, the second river boat built in Oregon, will be featured in the program.

Captain Riggs has asked descendants and friends of the original officers and owners of the Lot Whitcomb to give him as much of the personal history of those pioneers as possible, and also to be present. Original officers, he said, were Captain William L. Hanscome, commander; Captain W. H. H. Hall, pilot; Captain John H. Jackson, mate; Jacob Kamm, chief engineer; Blakesley Kamm, assistant engineer.

● **New Terminal Becomes Active.**

The new Columbia Basin terminal, ex-Admiral Line terminal, which was renovated and modernized during the spring, became an important factor in Portland's maritime activities during April, when both the Coastwise Line and Quaker Line began using it. Quaker Line moved from municipal terminal No. 1 to Columbia Basin terminal, but no announcement was forthcoming whether this move would remain permanent, or only temporary while terminal No. 1 is being constructed.

Coastwise Line gradually took possession of its six steamers, ex-Swayne & Hoyt vessels, renamed them with a "Coast" prefix, and began weekly cargo service between Portland, Seattle, and San Francisco and Los Angeles.

● **Feltre Repairs Delayed.**

Delays in discharging the water-soaked cargo of the sunken and refloated Italian motorship Feltre, and in cleaning the interior of the vessel's holds, held up drydocking of the vessel during the first half of April. The Feltre was rammed and sunk by the Edward Luckenbach February 17, was refloated and towed to an unloading berth at Portland's terminal No. 4 March 22, and was reported scheduled for drydocking April 17. Salvage and repair costs were expected to approximate $500,000.

The vessel's cargo was disposed of as rapidly as surveyors, owners and underwriters could agree upon its general average assessments and proper methods of disposal. Silver, copper and other non-perishables were taken by their owners, but $120,000 worth of unroasted coffee was finally disposed of to fertilizer manufacturers. Wines and vermouth were offered for sale to liquor dealers.

● **Radiotelephone for Lightship.**

Installation of a radiotelephone has been started upon the Columbia River lightship to permit members of the crew, aside from the regular radio operator, to transmit weather and sea conditions outside of the Columbia River entrance to shore stations and ships. The installation was planned by the engineering staff under E. C. Merrill, district lighthouse superintendent, in response to requests of steamship companies that a more adequate reporting service be established. After the regular operator goes off duty, crew members may report conditions to the lighthouse depot station at Tongue Point, near Astoria, which will then release the information to mariners.

● **Tug and Barge Ordered.**

Western Transportation Company has ordered a 90-foot diesel towboat and a 142-foot steel oil barge built by the Albina Engine & Machine Works for August 1 delivery. The towboat will be an improved type for Columbia and Willamette River work, and will cost about $75,000, while the barge will be capable of carrying 6000 barrels of petroleum products, and will cost about $40,000, according to Rex L. Gault, manager of Western Transportation Company.

Two 200-horsepower diesel engines, and a tall pilot house to permit the pilot to have a clear view over the tops of barges, will be features of the towboat, which will replace the recently-wrecked Ione.

● **Tire Dealer Turns Crab-Catcher.**

Tiring of selling automobile tires, M. S. Boone, Portland business man, recently disposed of his tire business and had built a 42-foot diesel-propelled crab fishing boat with which he expected to have a lot more fun and earn just as much money as he did when selling the latest in rolling cords. The Kay Bee, as Boone named his $9,000 craft, was constructed by Matt Tolonen, of the Columbia Boat Building plant, Astoria, and is propelled by a 100-horsepower Buda diesel equipped with a two-to-one reduction gear. It is capable of about

(Page 63, please)

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Ralph Myers Concentrates on Association Affairs

Ralph W. Myers, who has been connected with Hobbs, Wall & Co. for the past 30 years, resigned his position to take over the post of president and general manager of the Shipowners' Association of the Pacific Coast. He was manager of Hobbs, Wall during most of his time with the company, and is a veteran of the shipping industry on the Pacific Coast, at one time being president of the Propeller Club of San Francisco.

W. C. Quayle New S & C Port Engineer

On April 5 **W. C. Quayle** took over the post of port engineer for Sudden and Christenson, after having been with Matson line for the past five years, having been recently appointed in that capacity. Prior to his connection with Matson, he was with the Board of Marine Underwriters as marine surveyor at Portland and San Francisco, having previously served as port engineer with the Tacoma Oriental Steamship Company and the States Line.

Pilots

Frank M. Sweet, Astoria, and **Clyde Raabe,** Portland, have been reappointed members of the state pilot commission by Gov. Chas. H. Martin, of Oregon. **Captain Robert F. Caples,** Portland, was appointed to succeed **Captain William McNaught.** The appointments are for two-year terms, and will end in January, 1939.

Ralph W. Myers

W. H. Hoskier.

W. H. Hoskier Resigns

Announcement was made recently by **John M. Franklin,** president of I. M. M., of the resignation of **W. H. Hoskier** as Pacific Coast manager of the company. **L. E. Archer** has been appointed acting Pacific Coast manager in his place, with whom **R. J. Ringwood,** freight traffic manager, will work in close cooperation.

Kenneth Dawson New I. M. M. Vice-President

On May 1 **Kenneth D. Dawson,** who has been prominent in West Coast shipping circles, became vice-president of the International Mercantile Marine Company. In making the announcement, **John M. Franklin,** president, said that Mr. Dawson will have complete charge of all shipping operations of the various subsidiaries of I.M.M. on the Pacific Coast, with headquarters in San Francisco.

Mr. Dawson, anticipating his connection with the company, a short while ago resigned his post of president and general manager of the States Steamship Company in Portland, as well as the presidency of the Pacific Atlantic Steamship Company. He was previously in charge of shipping operations for Sudden & Christenson, and had achieved such a reputation in this field that, when the United States Shipping Board requested his services, he was sent to that organization during the years of the World War to serve as manager of operations in San Francisco. Then, from 1920 to 1928, he held the presidency of the Columbia Pacific Shipping Company of Oregon, during the latter year organizing the States Steamship Company with ships purchased from the government.

His association with I. M. M. began in 1931, when he headed a group of prominent shipping men who joined this company and the Roosevelt Steamship Company to purchase the United States Lines.

The new post will require the management of Pacific Coast business of the company's transatlantic lines, as well as the intercoastal subsidiary, the Panama Pacific Line.

Propeller Club of California Announces Banquet Plans

SPRING BANQUET AHEAD!

THE TIME—Saturday, May 22nd. Just to help you remember the big date let us remind you that it's National Maritime Day.

THE PLACE—Fairmont Hotel in San Francisco . . . the huge terrace ballroom.

THE INDUCEMENTS—Good fellowship, good fare, good fun.

The ticket committee already reports "everybody's going!". The banquet committee promises a "royal feast." The entertainment experts say "the show will surpass 'em all!"

We understand that Bryant O'Connor, Chairman of the program committee will pull some swell acts out of his Fedora . . . with Variety as the keynote. Just to help paint the picture of what to expect at this Event of Events, we are reproducing the photographic evidence of the last Propeller Club Jinks . . . staged in the very same surroundings.

There's Jim Cronin in the lower left corner telling Dr. O'Neill and friends how he uses piston-ring seals on his baby prune trees. Right above him is "Mac" McConkey handling elusive green peas without benefit of gyro.

That's Stan Allen way in the background against the black curtain . . . probably signaling the fan-dancer to go back for more feathers. Ah yes! They had fan-dancers in those old days. This would be about 1934 and it seems just like yesterday.

If you've attended these Propeller Club affairs over the years, you don't have to be sold. If you're a first-timer—shipmate o' mine—come aboard for the time of your life!

COMING ATTRACTION!

Charles H. Wheeler
Executive Vice-President
McCormick Steamship Company
Will address our
May 11th meeting.

Mr. Wheeler's annual addresses to the Propeller Club have always been outstanding features. Save the date! Bring a guest!

The membership committee is clicking!

We're proud to report these new Propellers:

Hugh Gallagher
Howard F. Bernhard
Captain Henry Spilman
Benjamin W. Berg
George Short
J. E. Barker
Hugh J. McPhee

See you at the banquet, fellows!

LUNCHEON MEETINGS

Lt. Commander Wesley M. Hague of the United States Navy made an impressive address to the Club at the April 6th meeting. His subject, "Welding in Ship Construction," was a semi-technical discussion of the rivetless method which is proving so successful . . . particularly in Navy yard work. We enjoyed his colorful descriptions of actual sea experiences. Commander Hague impressed us as belonging to the Sea. The manner in which he described his vessel's battle with a gale would do credit to a Conrad.

Appropriately for the theme of the program, John Greany acted as Chairman of the Day with President Edward Harms officiating at the helm.

SCHOOL SHIP HOMECOMING

The April 20th meeting was devoted to our official Welcome Home to the California Nautical School Ship. Chairman L. M. Edelman complimented the efficient officers who are administering schoolship activities, introducng Executive Officer George Barclay who very entertainingly narrated the Cruise of the California State. Speaker Barclay dwelt on the curriculum and the routine of the ship giving us convincing testimony of its splendid accomplishments in developing fine American officers and engineers for our merchant vessels.

Colored films . . . truly the most vivid 16 mm camera work we have ever seen . . . depicted the voyage "from Tiburon to Tahiti" with a few extra countries thrown in.

Surely his audience must have caught the inspiration of Mr. Barclay's talk. It's a grand work the Schoolship and its sponsors and friends are accomplishing!

IN MEMORIAM

A. L. Becker
C. M. Kennedy
Frank Schneider.

Erik Krag Launches Viking S. S. Co.

The coastal steamer Wapama, a wooden ship of 584 tons net register, has been purchased by **Erik Krag**, vice-president and general manager of Interocean Steamship Corporation. He is planning to form what will be called the Viking Steamship Company, so as to operate the ship in the coastwise lumber carrying trade, as well as any later acquisitions to the line. The Wapama, Krag says, has nothing to do with the affairs of Interocean. She was built at St. Helens, Oregon, and launched in 1915. She is 204 feet long, 40 feet wide, and 14 feet deep. Power is furnished by engines of 825 horsepower.

Interocean Appointments

Announcement was recently made by **Erik Krag**, vice-president and general manager of Interocean Steamship Corporation, of the following appointments to the staff, which became effective on April 15:

Howard G. Beadle, assistant operating manager, to handle operation of ships in conjunction with **Ray Demoro**, operating manager of the Interocean Line, Knutsen Line, "K" Line, Yamashita Line, Weyerhaeuser Line, and Pacific Coast Direct Line. He was formerly general manager of the Beadle Steamship Company.

K. H. Finnessey, assistant traffic manager "K" Line services, California to and from West Coast ports of South America; also the Orient-California services of the "K" Line and Yamashita Line.

A. H. Mortensen is traffic manager in charge of these services. Finnesey was formerly with the Silver-Java Pacific Line.

Augmented operations of its several intercoastal and foreign-flag agency services have necessitated the increase of the executive staff of Interocean Line in Southern California. **A. W. Gatov** has been appointed operating manager of the San Pedro terminals, according to a recent announcement made by **E. N. Tormey**, district manager. The appointment was made to fill the post left vacant by the resignation of **B. E. Bell**. Gatov was formerly chief clerk of the Dollar Line terminals in that city. Other appointments were: **R. L. Baldwin**, formerly with General Steamship Corp., as assistant manager of the intercoastal department; **T. L. Douglas**, formerly with Pacific Steamship Lines, to the intercoastal freight department; and **J. O. Pfahl**, also from Pacific Steamship Lines, to the accounting force.

Northwest Representatives for Xzit Pacific Co.

Howell H. Ware, Managing Director of Xzit Pacific Co., announces the appointment of Guy M. Thompson, 1241 Railroad Avenue South, Seattle, as Puget Sound sales and service representative. Mr. Thompson is one of the best known marine supply men in the Northwest. The firm of Steckmest & McDougall, Inc., 45 S.W. First Avenue, Portland, with Jim Marshall handling marine business, were named by Mr. Ware to conduct Xzit sales and service in the Columbia River territory.

Crane Packing in Larger Quarters

The Crane Packing Company have moved to their new quarters, 545 Second Street, San Francisco, where larger facilities for warehousing and storage of Crane products has been secured. Mr. Graham Smith, manager of Western sales, will make his headquarters at this address.

Mr. Ray Roshong has been appointed manager of the new branch office and warehouse in Los Angeles, 511 West Pico Blvd., to serve the Pacific Southwest industrial and marine territory.

L. A.—S. F. Service Resumes

With the resumption of service between Los Angeles and San Francisco, the Los Angeles-San Francisco Navigation Co. was reorganized with the following changes: **Harry Brown**, president; **R. W. Anderson**, vice-president - general manager; and **E. Norton**, secretary-treasurer. Anderson will continue as general manager, **D. A. Linthicum** as general agent at Long Beach, and **J. L. Mills** as representative in Los Angeles.

Mr. Brown, one of the most popular steamship men in San Francisco, is at present vice-president - general manager of Dyson Shipping Co. and president of the Interocean Steamship Corp.

Frederic A. Millerd, attorney, was recently appointed to the Long Beach Harbor Commission to fill the vacancy created by the resignation of Warren A. Lamport some two months ago. The appointment, made by Randall M. Dorton, city manager of Long Beach, was confirmed by the city council of that city.

The appointment of Theodore Matchett as New York freight agent for United Fruit Company has been announced by A. J. Brady, assistant freight traffic manager. Matchett's headquarters will be at Pier 9, North River. In his new capacity he succeeds Frank S. Lux, resigned, in turn being succeeded as soliciting freight agent by Howard C. Schultz.

Announcement was recently made from New York of the appointment of Philip E. McIntyre as assistant general freight traffic manager of the International Mercantile Marine Company. Basil Harris, vice-president of the company, made the announcement, adding that McIntyre would take over his new duties on May 1.

McIntyre is now Western freight traffic manager, with headquarters at Chicago. He succeeds to the vacancy created by the naming of Victor J. Freeze as general freight traffic manager in February, and will act as the latter's assistant in the supervision of freight business of the United States, Panama Pacific, and American Pioneer Lines. He will be succeeded in Chicago by O. A. Green, his present assistant, who has been with the freight staff of that office since 1913.

Word comes to us from F. W. Isherwood, Puget Sound district manager for the Coastwise Line, that Ross White has been named freight agent for the company. White served from 1929 as general agent in Tacoma for the Tacoma and Oriental Steamship Company and representative of the American Mail Line and Pacific Steamship Company. Previously he had been employed in the traffic department of the Pacific Steamship Company.

Bilge Club Notes of the Month

Annual election of directors and chairman, and many other important items of business, will be handled when the Bilge Club meets on the evening of May 4 for dinner at the California Yacht Club, Wilmington. At least three, and not more than four, new members are to be selected to serve on the seven-man Board of Directors.

Those who have been serving on the Bilge Club directorate during the past year include: Thomas B. Forster, superintendent of the San Pedro works of the Bethlehem Shipbuilding Corp., as chairman; J. J. Murray, San Pedro marine superintendent for the Shell Oil Co.; J. W. Malseed, marine manager for the Shell Oil Co. at Wilmington; A. R. Pegg, San Pedro representative for the International Marine Paint Agency; Robert S. Gardner, surveyor and marine salvage expert; John E. Marshall, ship agent and lumber handler; and James Craig, head of the Craig Shipbuilding Co. of Long Beach. L. S. Anderson is the club treasurer and James Buntin serves as secretary.

The ninth annual Bilge Club banquet and program of April 3 was voted a huge success by all of the 320 men who attended. It was again held at the Biltmore Hotel in Los Angeles with Chairman Thomas B. Forster presiding. San Francisco shipping men attending included Ed Harms, president of the Propeller Club of California; L. E. Archer, Tom Crowley, and T. Mizuno.

William Bennett, principal surveyor in the United States and Canada for Lloyd's Register of Shipping, was the guest of honor at the Bilge Club rooms in San Pedro on April 13. During his three-day visit in Southern California Mr. Bennett was introduced around shipping circles by F. G. Archbold, Lloyd's surveyor for Southern California.

A. Aronsen, representing the Norwegian Veritas and other Scandinavian shipping interests, was a Bilge Club caller during April. He was on one of his periodical visits to Southern California from his San Francisco headquarters.

HERCULES EQUIPMENT TAKES O. P. W. LINE

The Ohio Pattern Works and Foundry Company of Cincinnati, Ohio, announces appointment of the Hercules Equipment & Rubber Company, of San Francisco, as Northern California distributors for the O. P. W. line of valves and fittings.

This line fits in very well with the equipment department already established by Hercules. A complete stock of fittings is carried at the company's new store and modern warehouse, located at 550 Third Street, San Francisco. This new building was recently erected to meet the increasing need of a modern plant to carry on the company's growing business.

Frank D. Mahoney, who has for many years been identified with the equipment business, has been added to the Hercules sales force and will handle the O. P. W. line with Hercules, together with Hercules roller pumps and Wilbur fire extinguishers.

Taking over charge of the outward freight department of the Transpacific Transportation Company, Calvin Conklin has resigned his post with General Steamship Corporation, succeeding K. H. Finnessey, who resigned to go with the Interocean Steamship Corporation.

Shipbuilding

(Continued from page 54)

Order placed for DD404, 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION: SS180 Pollack, keel laid October 1, 1935; L.B.P. 292'6", beam 25', loaded draft 15'; launched September 15, 1936; estimated delivery May, 1937.

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion March 1, 1938; SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B.P. 302'6", beam 26'10", loaded draft 16'8".

SS192, Squalus, submarine; contract period started December 1, 1936; L.B.P. 302'6", beam 26'10", loaded draft 16'8".

Standard Oil Tankers

(Continued from Page 37)

● **Navigating Equipment**

Compass equipment on these vessels will be supplied by the Sperry Gyroscope Company and will include: A Sperry Gyro Compass of the new Mark XIV type with thermionic (non-contact) type follow up; three bearing repeaters; one steering repeater; one radio repeater; one rudder indicator; and one course recorder.

Steering control will be furnished by a Sperry two unit type gyro pilot. An incandescent spot type Sperry searchlight will be installed with mounting stand on each wing of the bridge.

The pilot house equipment will include a Submarine Signal Company Fathometer for continuous echo sounding and visual depth indication.

The radio equipment will be supplied by the Mackay Radio and Telegraph Company, and will include the following:

A 500 watt combination intermediate and high frequency transmitter;

An all wave Type 117A receiver and a crystal receiver;

A type 105-A Kolster radio direction finder;

A type 101-A radio auto alarm; and

A type 142-A 500 watt emergency transmitter with current supply from an Exide Type M. V. A.-13 six volt storage battery.

All of this radio apparatus will conform to the latest rules of the Maritime Inspection Bureau and the Federal Communications Commission for radio on American vessels of this type and class.

An A. Lietz electric sounding machine will be installed.

These new vessels will set a new and higher standard on the Pacific Coast in steam economies, in cargo capacities, in safety at sea and at dock, and in comfort for officers and crew.

Simmons double deck berth of the type to be used in crew quarters on new tankers.

Portland Port Notes

(Continued from Page 56)

12 miles an hour. Boone plans to fish for crabs in the sea outside of various Oregon small ports, centering upon Newport.

● **Port Personals.**

John H. Nolan, local inspector of boilers for the United States Bureau of Marine Inspection and Navigation, has been elected vice-president of the Portland chapter, Propeller Club of the United States, succeeding Willis K. Clark, resigned. Nolan was president of the Jacksonville, Florida, chapter, prior to coming to Portland.

Larry J. Hoffman, district manager for Swayne & Hoyt, Ltd., was elected to the Propeller Club's board of governors.

Captain Bert Newcomb and **Captain E. Ray Mooney,** well known Columbia River boatmen, have been added to the membership of the Columbia River Pilots Association, bringing the Association's active roster up to 31 men. Captain Newcomb was raised on the Mississippi River, rose to pilot and captain on the Yukon, and has steamboated on the Columbia and Willamette for 16 years. Captain Mooney was formerly pilot on the old State of Washington, and for the last four years was master of the Port of Portland towboat Portland.

G. C. Balzer, assistant lighthouse engineer, has been transferred to a higher rating at Milwaukee, Wisconsin.

April visitors to Portland included **Mr. and Mrs. J. R. Wierdsma,** of Rotterdam, Holland, the former president and managing director of the Holland-America line for 30 years. The visitors remained here one week and sailed from Vancouver, B.C., accompanied by Mrs. Wierdsma's sister, **Miss Elsa Grelle,** for Hongkong and round the world to Europe.

Trade Note

Manufacturers' Representative Expands—The growing business of the Frank Groves Company demanding more room, that wide-awake group of manufacturers' representatives on March 1 moved into their new building at 545 Second Street, San Francisco, where they are carrying on in a much expanded trade. The East Bay office is at 389 Seventh Street, Oakland, under the able management of Harry W. Logan. R. H. (Bob) Cartier is associated with Mr. Frank Groves at headquarters.

The manufacturers and lines represented by this firm include:

V. D. Anderson Company, Steam traps.

American Asphalt Paint Company, Valdura Paints.

Botfield Refractories Company, Fire Brick and Cement.

Crane Packing Company, Semi-Metallic Packings.

Flexitallic Gasket Company, Semi-Metallic Gaskets.

Gamlen Chemical Company, Metal Replacements.

Key Company, Key Caps and Compounds.

Nedmac Products, Packing, Pump Valves, Insulation.

Py-lubro Company, Inc., Packing Lubricant.

Thermoid Rubber Company, Mechanical Rubber Goods.

Pumps Ancient and Modern

(Continued from page 39)

A modern sand and gravel pump.

"Water Elevator." These water elevators were produced in sizes to lift from 5,000 to 500,000 gallons of water per hour.

Electricity became more generally distributed throughout the mining fields on or about the turn of the century, and this fact helped materially to bring into use, for deep mine pumping, the centrifugal type of mining pump. The centrifugal type of pump could be built in practically any capacity desired and for virtually any pumping head. One of the first deep mine installations of the centrifugal pump type was made, by Krogh, at the North Star mine at Grass Valley during 1905. This pump handled a total head of approximately 1800 feet.

At about this time a centrifugal type of pump was developed for mine shaft unwatering and sinking purposes, the pump and vertical motor being mounted in a supporting steel frame, the whole unit being hung on a cable and raised and lowered on wooden guides in the mine shaft to suit the work. Two 600-foot vertical shaft sinking pumps of this type were installed by us in the shaft of the Gold Field Deep Mines Co., also in the mines of the Tonopah Belmont Development Co. These first centrifugal mine pumps were of the solid shell type, and not nearly as efficient as the present day pump. The pumps used for this type of service at the present time are usually of the split shell type, it being possible to remove all the internal parts without disturbing the pipe lines. We have recently installed two of these modern split shell station pumps for 800-foot head at the Idaho, Maryland Mines Company at Grass Valley, and also two units of the same size and capacity in the New Brunswick Mine at Grass Valley.

Various pumps were required in mills which reduced the ore after it was brought from the mine shaft. In this process of ore reduction, it was necessary to use many pumps for the pumping of the mill tailings. In the beginning, ordinary lined dredging pumps were used. These pumps were very heavy and expensive and none too durable for this type of work.

During 1900 the Krogh Company developed the first real sand pump, which was entirely lined on the inside and constructed in such a way that the liner could be quickly and cheaply renewed. From time to time improvements have been made in the design of these sand pumps. Today the very latest type of sand pump is the new Victor-Kimball-Krogh "Sand and Tailings" pump. This pump is entirely lined, and is provided with a wear adjustment which permits taking up the wear

from time to time without opening the pump. The bearings are ball bearing external from the main body of the pump and contained within a tight oil chamber, with both waterproof and dustproof construction.

Krogh mine pumps have been designed and built since the early inception of the need for this type of equipment, and they are being used in practically every mining field the world over.

During over half a century of pump building, many improvements have been made and much experience has been at our command, and with the logical merger of the old Krogh Pump Company with the old Kimball Pump Company and the Victor Equipment Company, research and manufacturing facilities could be extended to the full measure required.

Somewhat concurrently, the Kimball "Direct Flow" deep-well pump was developed in Los Angeles, and the Victor Equipment Company's Kimball-Krogh Pump Division now produces a large variety of pumps for innumerable services, including the modern Deep-Well centrifugal pump for agriculture, industry, municipal services, oil companies, and mines. There have been added "Under-pass Pumps"; "Non-Clogging" types of sewage pumps and drainage pumps; various types of horizontal centrifugal pumps, etc.

While, during the early days of pump manufacturing, durability was perhaps of major importance, today's pumps must not only withstand natural wear and tear, but their pumping efficiencies have virtually doubled and are now reaching maximum theoretical possibility.

It will be interesting to mention here a few of the outstandingly large agricultural pump installations made by Krogh in the latter part of the 19th century.

Krogh had developed, in the late 90s, horizontal centrifugal pumps in sizes up to 50 inches. These pumps were belt driven and connected onto steam engines. The Fresno Water Company installed two of these in a compound arrangement with a single belt drive in the center for 125 foot head. This special compound pump had displaced an Eastern pump which had failed to give satisfactory results although costing, as the record discloses, ten times as much, and it was also, incidentally, the second installation received by the Fresno Water Company. During January, 1898, Krogh furnished a pumping plant mounted on a floating barge with a pumping capacity up to 90,000 gallons per minute and driven by a 250 H.P. engine. The diameter of the discharge pipe was 50 inches. This installation was made for the Old River Land and Reclamation Company, of Stockton, for draining 13,000 acres of land on the "lower division" of Union Island. At this particular time, John Herd was president and J. W. Ferris consulting engineer of this reclamation company. Two years earlier, a slightly smaller plant was furnished to Mrs. Jennie Smith and Cyrus Moreing, of Stockton. A 26-inch centrifugal pump was furnished to David Bixler for irrigating on Union Island. John Herd purchased a second plant for the purpose of draining Victoria Island, San Joaquin County, for a reclamation project consisting of 8,000 acres. The main canal at the point where the suction pipe of the pump entered

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Pumps Ancient and Modern

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was over 100 feet wide by 30 feet deep. The barges for these large plants drew from three to four feet of water. During these particular years, Krogh also manufactured the improved Link Chain Water Elevator, in sizes up to 500,000 gallon capacity per hour. The first one of this type was sold to Henry Voorman, of San Francisco, and was erected and operated on his ranch at Boldin Island. An old catalog indicates that these water elevators sold at prices from $260 to $700 each, and could raise water to a height of from 15 to 16 feet with less than 20 actual horsepower.

These were also the days when the so-called "Horse Power Pumps" were widely used in agriculture. These Horse Powers were sold for one or two horses, and the pumps connected thereto were available to force water to an elevation of up to 500 feet. Krogh sold these various Horse Powers and advertised them as "The Pony Power," "The Farmer's Friend," "Dairy Queen," "The Eclipse," "The Economy," "The Eagle," "The Monitor," etc.

The increased demand for centrifugal types of pumps created the patented Krogh compound vertical pump for heads of 100 feet and over. The first pump of this type was installed during the early part of 1894, and its performance attracted world-wide attention and was discussed in leading technical journals of this country and Europe. Simultaneously, Krogh manufactured, under Shaw's patent, an improved propeller pump for 8-inch, 10-inch, and 12-inch wells, with propellers set at intervals of either 5, 7½, or 10 feet, depending upon size. A definite improvement upon this type of pump was made by Kimball in Los Angeles, in his so-called "Direct-Flow" deep-well turbine.

The development of the great oil fields in California created, even prior to the beginnning of the 20th century, a wide demand for oil pumps. Krogh designed and sold oil pumps with capacities from 13 to 320 gallons per minute, at prices ranging from $30 to $175.

In a previous part of this article we mentioned "air lift" pumps. Krogh manufactured the so-called Pohle air lift pump for pumping water from "deep bored wells." A plant of this type consisted of steam boiler and steam engine, compressor, air receiver, air pipe to bottom of well, and a discharge pipe. A patented hydraulic dredging pump was also developed by Krogh in sizes from 2 to 20 inches. These were largely used for river gravel mining and pumping of tailings for cyanide plants. These pumps passed rocks seventy-five per cent of the size of the suction and discharge openings without clogging and without injury to the pump. An old journal indicates that Krogh advertised these dredge pumps to raise solid material up to 900 cubic yards per hour.

Innumerable advancements have been made in water pumps for many purposes. The elimination of road crossings has called for non-clogging types of underpass pumps. Similar types of pumps are required, for instance, in the handling of fish.

PACIFIC MARINE REVIEW

JUNE
1937

U. S. Army Engineers'
Dredge on the Job
off Gray's Harbor

Official Organ of
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Steamship Association
Shipowners Association
of the Pacific Coast

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Our Federal Government and Our Merchant Marine

By Joseph P. Kennedy
Chairman, U. S. Maritime Commission

There have been sharp clashes about our maritime policies in the last four years, not only in the committee rooms and halls of Congress, but in public forums and the press. But in all the discussions, charges, countercharges, accusations, reports, recommendations, and debates which preceded the present legislation, all contending factions agreed on one thing, to wit: *That America must have an adequate Merchant Marine.*

That resolve of the American people has been the driving force behind a quarter century of legislation. Immense sums of money were expended, an administrative agency with unprecedented powers was set up, and the Government itself built many ships. But for one reason or another we did not get the flag service we wanted.

In 1928 Congress finally decided that only through a comprehensive plan of subsidies could the job be done. Aid was extended through the mail contracts. The Government contracted to pay out over thirty million dollars per annum to shipowners in this way. But once again the program as a whole was a failure. Despite large grants and liberal loans, relatively few ships were constructed to replace our aging fleet.

There is no value now in arguing how far American shipping operators were to blame. Certainly the world-wide economic collapse had a lot to do with it. And I agree that the sins of the few should not be saddled upon a whole industry. Nevertheless, public confidence in the shipping business was justifiably shaken as testimony before a Senate Investigating Committee revealed improper salaries, "milking" devices, and other abuses which showed that the "subsidies" had been abused.

It is convincing proof that the American people will never abandon their determination to have their own ships; that even after these revelations Congress was willing to make a fresh start. As the president recommended, the new Act, under which the Maritime Commission is functioning, abolishes the subterfuge of mail contracts. In its place the government is to pay two kinds of direct subsidies. One is payment to the *ship-owner* of the difference between the American and foreign operating costs. The other is payment to the *ship-builder* of the difference between the American and foreign costs of construction. The keynote this time is competitive equality, not *favoritism.*

By this Act, Federal aid to shipping is put upon a frank, open, and aboveboard basis. Candor has many and obvious advantages here no less than in other phases of life. We now know what we are getting and what we are paying for. We can keep real books. Even a romantic business cannot ignore arithmetic.

Here, then, is the third try of Congress at what the American people desire so intensely. For the third time Congress has rejected government ownership as a way of securing an appropriate merchant marine. Perhaps it would not be untimely to suggest that, in view of such an intense purpose to have an adequate merchant marine, another failure of private enterprise may bring about a different method of achieving the goal. If the government has to pull the whole load again, the people may want to own the tow as well as the tug.

The Commission, the ship operator, the shipbuilder, labor, and the public have a joint responsibility for the success of this law. How can each of these groups contribute to that common objective?

● *The Maritime Commission.*

So far as the commissioners are concerned, the nation may count upon their unanimous determination to administer this Act with all the skill and fairness at their command. We must meet many difficult problems of understanding and judgment. We must have more than technical skill. We must be statesmen who can both harmonize the individual interests of the various groups affected by this statute and subordinate such interests to the national welfare. We are the agents of no class. We are the servants of the whole American people.

The determination of a proper subsidy is certain to

JOSEPH P. KENNEDY,

Chairman, U. S. Maritime Commission.
A dynamic, forceful personality determined to energize the American Merchant Marine. Says he:—"I think the future of America is assured to be one of unexampled prosperity and greater happiness for greater numbers than the world has ever known."

be a difficult task dependent on many variables. In the beginning our approach may not be as scientific as we would like.

But of this you may be sure. We shall not forget the terms of the statute, that we do not serve as guarantors of profit. We have not been appointed to subsidize laziness, inefficiency, and poor management.

On the other hand, every legitimate encouragement should be given to private enterprise, so that much needed new capital may be attracted to the shipping business. One of the principal ways in which the Commission may furnish encouragement is through the stability of its administration. Capital will not be attracted by immediate subsidies and nothing more. Investors will ask for proof that the Commission will be fair and businesslike and that its policies will not be subject to change without notice. With such an assurance there will be a real stimulus for new capital to get behind this great industry, an industry which, in my judgment, is entering upon a most profitable era.

● *The Shipowner.*

The ship *operator* is, of course, the key to the success of the whole program. So far as he is concerned, if the Commission determines that he operates in an essential trade route and that he is financially able to carry out his venture, he need no longer fear the threat of unfair competition in costs. Under this law it will then become a contest of his intelligence, skill, industry, and thrift against similar qualities in his competitor. There is a deeply ingrained tradition of the American businessman on land or on sea to ask for nothing but "a fair field and no favor." The American shipping industry may take heart that any present disadvantage, arising out of its position in an internationally competitive business, will be eliminated, and that in the application of the law political or other improper considerations are to have *no standing whatsoever.*

● *The Shipbuilding Industry.*

So far as the *shipbuilder* is concerned, we must frankly recognize that the statute represents an effort to subsidize his industry. This has not been done because the administration has a particular affection for the ship construction companies of this country. Not at all. It was done because a realistic Congress recognized that in the scheme of national defense, as well as for the proper assurance of replacements of our merchant marine, the shipbuilding industry must be maintained. And shipyards, to be really maintained, must be *used* as well as equipped. They must not rust while they wait—they must be going concerns.

Of course, we will pay more for ships so constructed. But we will be paying for more than just the ships themselves. This construction differential subsidy is for the builder, not the operator. And even for the builder, the only advantage will be his increased business. In that American material, men, and labor will participate.

There need be no profiteering. The government is permitted by the statute to enter the ship construction industry, if necessary, to stop profiteering.

But regardless of the powers the government has to prevent unfair practices, I feel that the leaders of the industry are going voluntarily to show themselves to be broad-gaged enough to recognize that the future of their business depends on the success or failure of our present efforts. If a sound and constructive administration results from the cooperation of all groups, the shipbuilding industry can be assured of an orderly program of replacements to create a steady demand for its services.

Most of our ships are so old that, assuming twenty years as a conservative estimate for the life of a ship, eighty-five per cent of our fleet will be fit for retirement *in five years.*

That single statement shows clearly the crisis facing our merchant marine. What's the sense of talking about an adequate or a first class merchant marine in the face of such facts? For us an *adequate* merchant marine has to be a *new* merchant marine.

The government, with the assistance of the shipping industry, must begin a program which will equip our overseas trade so that it may be second to none in first class equipment. We are going to lay the keels for new fast ships. And we are going to do it *NOW.*

● *The Personnel Question.*

Anyone in the slightest way familiar with shipping must realize that the Commission's job to encourage first-class personnel on ships is far more important even than the building of the ships themselves. We know perfectly well that today, as in the days of wooden ships and iron men, the men are more important to the safety of the passengers, the cargo, and the nation than the ships themselves.

The Act requires the Commission to establish minimum manning scales, minimum wage scales, and reasonable working conditions, for all officers and crews employed on all types of vessels receiving an operating differential subsidy. The Act further provides that any increase in operation costs by reason of a rise in wages or a change in working conditions shall be added to the ship operator's differential subsidy. That means that the government now determines the standards of a self-respecting life at sea—and the tax-paying public pays the additional cost.

And because the Commission does realize the importance of man-power on shipboard, and that it can't be had in this day and age of competition ashore without a square deal, shipping labor can rest assured that for economic as well as humane reasons the Commission will see to it that they get a square deal.

In return, the Commission trusts that the American seamen will give the Commission and the tax-paying public a square deal.

If we are going to make this thing succeed, the seamen must think and act in the spirit of this law. They must want leaders who are honest and sincere. In

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The Outlook for Peace in the Pacific Coast Maritime Industry

By Almon E. Roth

President of the Waterfront Employers' Association and the Pacific American Shipowners' Association

Probably the best way to appraise the chances for continued peace on the waterfront will be to consider the various factors which make for stability in the maritime industry and then point out some of the reefs and rocks through which the good ship "Maritime Industry" must still navigate. A cold appraisal of these items indicates that if both parties will deal fairly and in good faith, there is no real cause for serious trouble at the present time.

In the first place, the maritime industry of the Pacific Coast is far ahead of most industries of the United States in the development of collective bargaining as a basis for industrial peace.

● Collective Bargaining.

A recent report by Joseph B. Eastman, Federal Coordinator of Transportation, contains the following summary of the necessary steps in the development of collective bargaining:

"There are four requirements of the collective bargaining process which will serve as tests of the stage of development of organized employer and employee relations in the several branches of the transportation industry. First, there must be an acceptance of the collective bargaining principle by both employers and employees; second, the organization to represent any given group of employees must be determined; third, there must be agreements regarding hours, wages, and working conditions; and, fourth, effective provision must be made for interpreting and modifying agreements and for the disposition of disputes that may arise under them. In some cases an industry or an individual unit of an industry may reach the fourth stage in the course of a single negotiation proceeding, but more commonly the process extends over a period of time."

Most of our present labor troubles throughout the United States involve the first two steps of this process, that is, acceptance of the principle of collective bargaining and the determination of the proper agency to represent the employees. So far as the maritime industry on the Pacific Coast is concerned, these two troublesome issues have been settled and we are now well embarked on a program of collective bargaining with fully recognized labor organizations. In this connection it should be noted that the maritime industry of the Pacific Coast, both from the standpoint of the unions and the ship operators, is organized on a coastwide industry basis.

● Agreements Coastwide!

The contract which ended the strike and contracts supplemental thereto have been negotiated by joint committees representing all of the ship operators on the Pacific Coast on the one side, and all of the local unions of the Pacific Coast on the other. When one considers that the recent strikes involved 35,000 marine workers in seven parent maritime unions composed of 59 locals, and that the committee representing the employers acted for six associations involving 139 employing companies, including stevedores, terminal or dock companies, and steamship owners operating a total of 348 American Flag vessels, one can appreciate how difficult it has been to harmonize the interests of such a far-flung industry. The very fact that it has been possible to conduct collective bargaining among these far-flung groups through joint committees representing all of the various interests, is a real accomplishment in labor relations.

We have also made real progress on the other requirements mentioned by Mr. Eastman, to wit, negotiation of agreements covering wages, hours and working conditions, and the establishment of machinery for the interpretation of agreements and the prompt disposition of disputes arising thereunder.

Most of the controversial matters which in the past have resulted in strikes have now been reduced to written contracts through negotiation, although some of these contracts have not yet been ratified by the membership of the unions.

● Items Outside Agreements.

The agreement of February 4, 1937, between the Waterfront Employers Associations and the International Longshoremen's Association, which settled the recent disastrous 98-day waterfront strike, fixed working hours and wages and provided that the following items should be referred to a joint committee for negotiation and final settlement:

1. The adoption of a uniform safety code;
2. A coastwise agreement on penalty cargoes, or differentials to be paid the longshoremen in addition to their wages for handling offensive cargoes;
3. Adoption of maximum sling loads on standard commodities to be applied on a coastwise basis.

A joint committee representing the employers and the I.L.A., after many weeks' negotiation, finally reached complete accord and agreement on all of the above matters, with the exception of the application of one safety rule out of a total of 107 to certain vessels in the coastwise trade.

Formal contracts covering the agreements reached on sling loads and penalties have been prepared and are awaiting ratification by the unions.

Agreements on all of these items are supplemental

to the agreement of February 4, 1937, and if ratified will become a part thereof, and will be renewed annually until and unless either party requests a revision thereof upon sixty (60) days' written notice prior to the expiration date.

The negotiations on penalty cargoes and sling loads involved investigation and agreement upon ninety-five (95) separate items. When one considers that practices on these items have varied not only among the various ports, but also among operators within a single port, it is apparent that the joint committee faced a most difficult task in agreeing upon standard cargo penalties and sling loads which are to apply on a coastwide basis.

● Importance of Agreements.

The adoption of these agreements is of great importance to the industry and to the longshoremen because it will remove these controversial matters from the field of separate port action and place them on a coastwide basis, thereby reducing the chance for interruption of work due to misunderstandings between local unions and local employers. If these agreements are ratified by the coast membership of the I.L.A., the fundamental issues and working rules involved in the recent strike and those preceding it will have been settled and agreed upon by negotiation. This is important because settlements reached by negotiation have always proved more satisfactory than arbitrations to both the employers and the longshoremen. If the agreements are ratified, the future stability of the waterfront industry will depend upon the good faith of all parties in living up to the contracts and in agreeing upon their interpretation. Despite efforts to make the contracts as clear as possible, it is inevitable that differences of opinion will develop over interpretations thereof and the application of schedules agreed upon. There is no reason, however, to anticipate serious trouble from this source. On the contrary, there is every reason to expect that if the employers and the longshoremen demonstrate their ability to sit down in friendly fashion and in good faith reach agreement on such troublesome matters as penalty cargoes, sling loads and safety rules, they should have no difficulty in agreeing to the interpretation of these contracts by the same common sense procedure.

It should be noted that these agreements on sling loads and penalties have not yet been ratified by the membership. It is not certain that they will be ratified by the rank and file of the unions. One thing is certain, however. The contracts are fair and reasonable. The best evidence of this fact is their approval by the representatives of unions who served on the negotiating committee, and the fact that the loads agreed upon are below the acceptable present practices in three out of the four principal ports of the Pacific Coast. The shipowners have acted in utmost good faith in negotiating these troublesome points and in reaching agreements with the representatives of the unions, and the charges heretofore made that shipping interests were stalling and would not meet the men on these issues have been proved to be unfounded. If the contracts are not ratified, the responsibility for disputes arising from the very troublesome matters of sling loads and job actions will be squarely on the shoulders of the unions and their representatives.

● Port Committees.

We also have made real progress in the fourth step mentioned by Mr. Eastman—the provision for machinery to interpret and modify agreements, and for the disposition of disputes which may arise thereunder. Port committees have been set up by mutual agreement in the principal ports to hear and determine disputes arising on the ships. Labor Relations Committees have been set up in each port to interpret contracts and settle minor disputes known on the front as "beefs," which if not attended to immediately might grow into serious troubles. You will be interested to know that the Labor Relations Committee in the Port of San Francisco has been handling an average of approximately ten such disputes per week, with apparent satisfaction to both the employers and the employees. While we have been a little slower in perfecting our machinery for handling offshore disputes, real progress is being made in this direction and many matters which might grow into serious trouble are being satisfactorily disposed of.

One of the former complaints of the unions was that there was a large surplus of men and an improper distribution of work. The situation has been reversed so that now the employers are not able to secure sufficient registered longshoremen to do their work.

Under the present hiring hall system the registered men are protected against competition by outside workers, who formerly drifted to the front for casual employment, and the work has been more equitably distributed among the regular longshoremen.

● Hours and Wages.

In San Francisco in 1935 the average earnings were $44.00 per week for 39 hours of work. In 1936 the earnings approached $50.00 per week for 40 hours of work.

A small percentage of registered men refuse to report regularly and their earnings are proportionately decreased. The earnings of Pacific Coast longshoremen and of American seamen are the highest paid for similar work anywhere in the world. The value which the longshoreman places upon his job is indicated by the fact that the sons of longshoremen are given preference in being admitted to the unions and in the distribution of jobs. Twenty-five per cent of all of the new men now being admitted to the unions are sons of longshoremen. We are rapidly developing a situation comparable to the guild system.

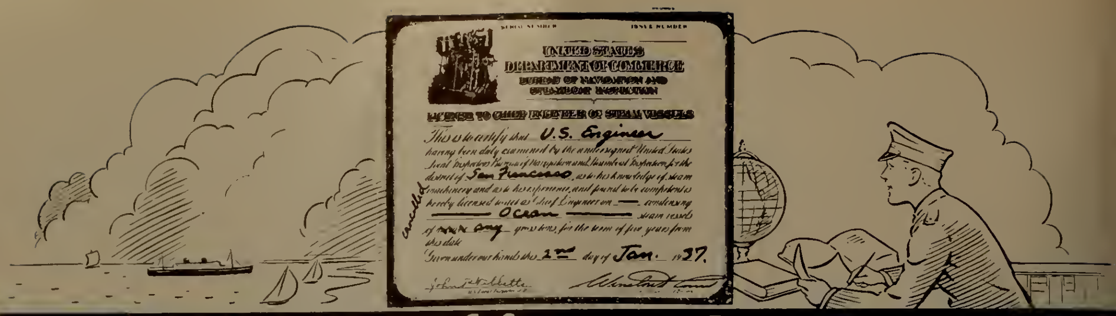
A recent study by the National Industrial Conference Board throws some interesting light upon the matter of wages for longshoremen. According to this study the average weekly earnings for longshoremen on the entire Pacific Coast was $43.40, as against the following figures in several other industries:

Automobiles	$36.16
Printing	34.07
Heavy equipment	27.99

The average for 25 manufacturing industries was $25.70 a week, compared to $43.40.

The present rate of pay for longshore work on the Pacific Coast is 95 cents an hour straight time, and $1.40 an hour overtime, with straight time on a six-hour basis. Incidentally, straight time is the first six hours

(Page 60, please)



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

Get Your License

"From the many inquiries which come directly and indirectly from the juniors and non-licensed men in the engine and fire room, it is evident that the barrier which seems to prevent them from obtaining licenses or raise in grade is the lack of, or understanding of formulae, of use of letters or symbols for values or numbers, and of practice in arithmetic, square root, simple figures.

"A man will never accomplish anything unless he first gives it thought and study, then tries it.

"Every man in the engineering department should obtain his original license just as soon as his sea service is adequate, and should raise the grade as soon as legally possible thereafter. It is really a great satisfaction to an engineer to have a license. Many men do not go after the license until the chief engineer or port engineer tells him he will be promoted as soon as he has a suitable license. For every chief engineer who tells the man to get a license, how many are there who wish the man had a license but do not mention it to him, but bring a new licensed man aboard instead?

"Young man, study, think, know; then go get your license!"

"The Chief."

LETTERS TO "THE CHIEF."

"Please explain to me what these new rules are, and where can I get a copy? One of the engineers on my ship came back from the license examiners, who told him to 'study the new rules.'"

The General Rules and Regulations (GRR) of the Bureau of Marine Inspection and Navigation are contained in the "Blue Book," of which the last issue is March 2, 1931. The advance in the art of engineering has been rapid, particularly in marine boiler construction. As a result it becames necessary to revise the rules to meet requirements.

Rule I, Specifications for Material, and Rule II, Design Construction and Inspection of Marine Boilers, were revised January 1, 1935, in the Brown Supplement to GRR. These may be obtained from the steamboat inspectors at almost any United States port and from the Government Printing Office, Washington, D.C. We are mailing you a copy.

"Please explain exactly what is the difference between the impulse and reaction turbine, and also what is the impulse-reaction principle. I have examined many rotors of turbines and cannot tell from the shapes which is which. Other engineers tell me that the impulse turbine pushes on the blading by force of the jet and the other by the reaction of the jet, yet they both look alike to me."

This is a very good and sensible question, and is much misunderstood. However, it is too involved to discuss here, and instead we are sending you a copy of the March issue of Pacific Marine Review, in which this is carefully described under "Your Questions Answered."

QUESTION

Why do modern turbine ships give so much attention to lubrication, with thermometers, oil coolers, gravity tanks, sight feed on flood lubrication, when on the reciprocating engine such are not needed, and failure of oiling meant warming up of the bearing, which was noticed by feeling it on the regular rounds by the oiler?

ANSWER

Lubrication on turbines and gears is probably the most vital element of all in successful operation. The reason is that failure of lubrication on the high speed bearings results in an accumulation of heat so rapidly that it is not carried through to the outside of the housing in time to give any warning. Just a few revolutions at full speed of a high speed bearing without lubrication will wipe the babbitt and score the shaft,

finally lowering the rotor, causing it to rub the blading off, and stall the turbine, resulting in a complete loss of the unit beyond any emergency repairs at sea.

QUESTION

What is the journal?

ANSWER

The journal is that part of the shaft which runs in the babbitted part of the bearing. It is the smooth steel cylindrical surface spinning at high speed on a film of oil.

QUESTION

Does the journal actually float on the oil?

ANSWER

Yes; there is positively no mechanical contact between the journal and the bearing while at speed, properly lubricated. A turbine in a stationary plant was allowed to run for a great many years without being shut down at all, and when finally dismantled for inspection, the journals were stained a dark brown color from the oil. They had lost the polished metallic appearance. The babbitt had its original tool marks.

The only mechanical contact which may occur is at starting and shut down, where the first revolution at start and the last at stopping may be a sliding contact between journal and bearing. This is enough to keep them rubbed clean of stain. There should be no wear of bearing or journal throughout the life of the unit. If there is any, it is because of improper lubrication during starting and stopping, or impurities and abrasive material in the oil.

QUESTION

What is the general theory of lubrication?

ANSWER

It is the theory of liquid friction. Any liquid or gas will lubricate (that is, separate) two surfaces having a pressure to force them together and a relative motion, provided the lubricant can be fed into the space between the surfaces as fast as it tries to squeeze out. A model demonstrating the action of the Kingsbury thrust bearing has been displayed, using air as a lubricant. The surfaces of both the collar and the shoes are ground and polished to a perfectly true, plane, mirror-like finish. Then it is put into motion before they take the thrust load, and they drag in a film of air faster than it can be squeezed out. This film of air supports the thrust load. A battery and buzzer test shows no electrical or mechanical contact between the moving and stationary parts. Result, lubrication by a film of air. But this, of course, is impractical for general use.

A definite film of lubricant must be continuously maintained between the journal and bearing; to accomplish this, the following conditions must be fulfilled:

(1) The surfaces must be geometrically true, i.e., a surface for thrust must be a true plane,* and a surface for a journal or a bearing must be a true cylinder.*

*It must be understood that this trueness, as used here, refers to irregularities, from those microscopic in size to those caused by nicks, mars, hammer marks, tool marks, even scratches and marks from a steel rule or the blocks or ropes used in handling. The shape of the bearing may vary from a cylinder in order to provide more horizontal than vertical clearance, or to provide channels for the lubricant.

These surfaces must be true to a tolerance of less than 1/5 of the thickness of the film of lubricant. For high speeds this means that hand scraping of bearings cannot be allowed. The finish cut must be machined true, with no scraping or spotting.

(2) A means provided for supplying the liquid lubricant to the bearing and for spreading it over the surface under load. This includes the provision for admitting the lubricant to the thick portion of a wedge-shaped clearance between journal and bearing, so that it will be dragged into the loaded area by its adhesion to the surface of the journal. The clearance space will get thinner as the liquid is squeezed out.

(3) The liquid lubricant should have properties of high adhesion to surfaces, so that it will be dragged into the pressure area.

(4) The lubricant should have property of low cohesion, that is, low internal friction, so as to spread easily over the surfaces to be lubricated and to reduce the liquid friction losses.

(5) Some provision for carrying away the heat generated by the liquid friction. High speed journals generate more heat than can be liberated by natural cooling at a safe temperature. Therefore, an excess of lubricant is generally supplied to flood the bearing and carrying away the heat. The lubricant must be cooled before returning to the bearing.

(6) The lubricant must be physically clean and chemically pure in the sense that it must have freedom from foreign matter, such as soluble substances, water, acids, alkalies, or substances damaging to the metals of the bearing and journal. Also, it must have a reasonably long life and not evaporate easily.

Petroleum oils, refined from selected crude oil and of proper characteristics as to viscosity, meet the requirements for a lubricant for high speed journals most admirably. The refiners of crude oils have recognized the special requirement of turbine lubrication and offer oils which are highly satisfactory.

QUESTION

What is meant by oil clearance?

ANSWER

If the journal and bearing were exactly the same diameter there would be no room for the oil film, or, in other words, the oil would build up great pressure in squeezing out.

For oils of a satisfactory viscosity for high speed bearings, it is customary to allow a definite clearance or oversize of bearing over the journal. This amount is:

For vertical clearance, .001 in., plus .0015 in. for each inch of journal diameter.

For horizontal clearance, .001 in. plus .0025 in. for each inch of journal diameter.

This clearance is enough to prevent oil pressure from building up on the side of the journal opposite to the loaded area, and at the same time is close enough to prevent the shaft from moving up and down or horizontally. Too much clearance would allow the shaft to vibrate laterally in the bearing.

QUESTION

What is good practice in loading a high speed bearing?

(Page 65, please)

HUGO P. FREAR,

Consulting Naval Architect for the Bethlehem Shipbuilding Corporation, Ltd.
Mr. Frear received much of his practical experience as a naval architect at the old Union Iron Works at San Francisco. He is recognized as the dean of American naval architects, a master of his art, who tempers theory with a shrewd recognition of the operators' problems and an inspired application of common sense.

Improved Tanker Construction

Standard Oil Company of New Jersey Building Four New Tankers at Sparrows Point Yard of Bethlehem Shipbuilding Corporation, Ltd., on the Frear-Bethlehem System of Structural Design

Construction of new bulk oil carriers and replacement of old tanker tonnage has, during the past year or two, brought back much activity to the American merchant shipbuilding industry. Already several of the new ships have been delivered, and many are under construction, with still more new orders contemplated. Among these, the largest order from a single company yet placed is that of the Standard Oil Company of New Jersey, under which ten ships of approximately similar size are being built in this country. Four of these vessels are now under construction at the Sparrows Point Plant of the Bethlehem Shipbuilding Corp., Ltd., at Baltimore, Maryland.

These four tankers will follow in general the customary arrangements for recent bulk oil carriers, with machinery and crew's quarters aft and officers' accommodation and navigating spaces in a deck house amidships.

The principal dimensions are:

Length over all, about	463 ft. 1 in.
Length between perpendiculars	442 ft. 0 in.
Breadth, molded	64 ft. 0 in.
Depth, molded	34 ft. 10 in.
Designed draft, molded	28 ft. 4 in.

The deadweight capacity will be 13,000 tons, and the cargo oil capacity 106,400 barrels. The vessels are designed for a speed of 13 knots on trial, on 3500 shaft horsepower. They will be fitted with contra-guide rudders and contra-propellers.

The propelling machinery on each ship will consist of a single screw installation of cross-compound turbines, designed and built by the Bethlehem organization, and driving a four-bladed wheel through Falk double reduction gears. Steam will be supplied by two Foster-Wheeler water tube oil burning boilers.

These vessels are being built to the highest class of the American Bureau of Shipping, under their special survey. They will also be in accordance with the regulations of the Bureau of Marine Inspection and Navigation, of Lloyds Register of Shipping, and will be suitable for the carriage of petroleum products through the Panama and Suez Canals.

● General Arrangements.

The tank space of each of these vessels will be divided into 24 compartments, each the full depth of the hold, by seven transverse and two longitudinal bulkheads.

Forward, a dry cargo will be provided, with a large

Model tank, built on Frear-Bethlehem system, under test. Upper view shows bulge under 100 feet head; center shows end of tank after 135 feet head; lower shows section of tank after 310 feet head.

hatch through the main deck, and below it a ballast tank, both separated by a cofferdam from the cargo oil tanks. A small pump room will be provided forward, in which will be installed a fire, bilge and ballast pump and a fuel oil transfer pump.

The cargo oil pumps will be located aft, between the machinery space and the cargo oil tanks. These will be Northern rotary type, electrically driven pumps, two units having a capacity of 2800 gallons per minute, and one of 1000 gallon per minute capacity. The pump motors will be located in the forward end of the machinery space, driving through stuffing boxes, the pumps on the other side of the bulkhead. Pump room illumination will be furnished by recessed lights behind vapor-proof glass windows, providing the greatest possible protection against fire and explosion.

The space at the sides of the pump room, and also that above the pumps, will be utilized to form three fuel oil tanks holding the ship's normal supply of 4250 barrels. This arrangement is compact without being crowded, allows a maximum of cargo cubic, and provides safe and convenient operation as well.

Excellent accommodations will be provided in the midship deck house for the captain, three deck officers, radio operators (together with radio equipment), steward, purser, and doctor. Aft, on the upper deck and in the deck houses, are mess rooms for officers and crew, galley, crew's smoking rooms, cold storage spaces, provision stowage, laundry, hospital, accommodations for the five engineering officers, and 18 rooms for the crew of 36 men. In addition, a large spare room fitted with two single beds will be provided in the midship house.

Cofferdam being lifted into position.

Transverse and wing bulkheads, Frear-Bethlehem fluted plate system.

● **Construction.**

Probably the main point of interest in these vessels is the new structural design applied to longitudinals and bulkheads, and used on these four vessels for the first time anywhere. This design was developed by Mr. H. P. Frear, Consulting Naval Architect for the Bethlehem Shipbuilding Corporation, and was worked out in detail by Mr. Frear, assisted by the Bethlehem designing staff at the Fore River Plant.

In its application to longitudinal framing, this system was thoroughly tested in an experiment made at the Fore River Plant during 1933 and 1934. Some results of this test were published before the Society of Naval Architects and Marine Engineers, in November, 1934, in Mr. Frear's discussion of Mr. David Arnott's paper on Welded Ship Construction.

This experiment consisted of a hydrostatic pressure test on a tank built of plating and channel bars, to simulate a portion of a longitudinally framed vessel—bulkhead, transverse, and shell plating. The tank was 8 ft. 0 ins. long, 7 ft. 6 ins. wide, and 4 ft. 2 ins. deep, and was constructed of the most suitable scantlings, for the purpose, in stock. The top and bottom were of 20 pound plate, each with two longitudinals of 10 ins. x $3\frac{1}{2}$ ins. x 24.9 pound channels. The sides were of 20 pound plate, each with one channel bar, 10 ins. x $3\frac{1}{2}$ ins. x 23.6 pounds. The ends of the tank (considered for this test as one bulkhead and one transverse) were of 22 pound plate. Top, bottom, and sides projected two feet beyond the end bulkheads, and longitudinals extended sufficiently to permit connections which would have the effect of a continuous beam over

Main transverse bulkhead and center girder.

bulkheads and transverses. Tightness was obtained by double continuous fillet welding.

Connections of longitudinals at end bulkheads of the tank varied in order to test several different types against each other and against an actually continuous beam. The basic idea was to obtain a connection which would permit the longitudinals to be cut at bulkheads, for ease of construction, and yet carry the strength of the longitudinal across the bulkhead, producing the effect of a continuous member of constant strength throughout the entire length of the cargo space.

The test was made by putting the tank under hydrostatic pressure internally, and measuring the deflections of the longitudinals as the pressure increased. After each reading of the deflection gages, the pressure was dropped to zero, to determine the points where permanent set first occurred.

The first evidence of permanent set occurred on one pair of longitudinals at a head of about 75 feet of water. No other permanent set occurred until a head of 110 feet had been reached. After a head of 230 feet of water (100 pounds per square inch) had been applied, the tank was emptied and examined internally. Then it was again filled, and the pressure was increased to 135 pounds per square inch (310 feet of water), at which point the side plating ruptured, concluding the test. Subsequent examination showed that, while there were differences in the resistance of the attachments when tested to destruction, all of them remained intact long after the yield point of the longitudinal itself had been passed, and would therefore be eminently satisfactory in practice. It is also worthy of note that no permanent set occurred, on the longitudinals which were continuous through the bulkheads or on those which were joined by the U-section plate or the round bar section welded to the flange (see photographs), until a head of 110 feet of water had been applied—more than twice the normal test head on even a large vessel, and far greater than would ever be encountered in actual service.

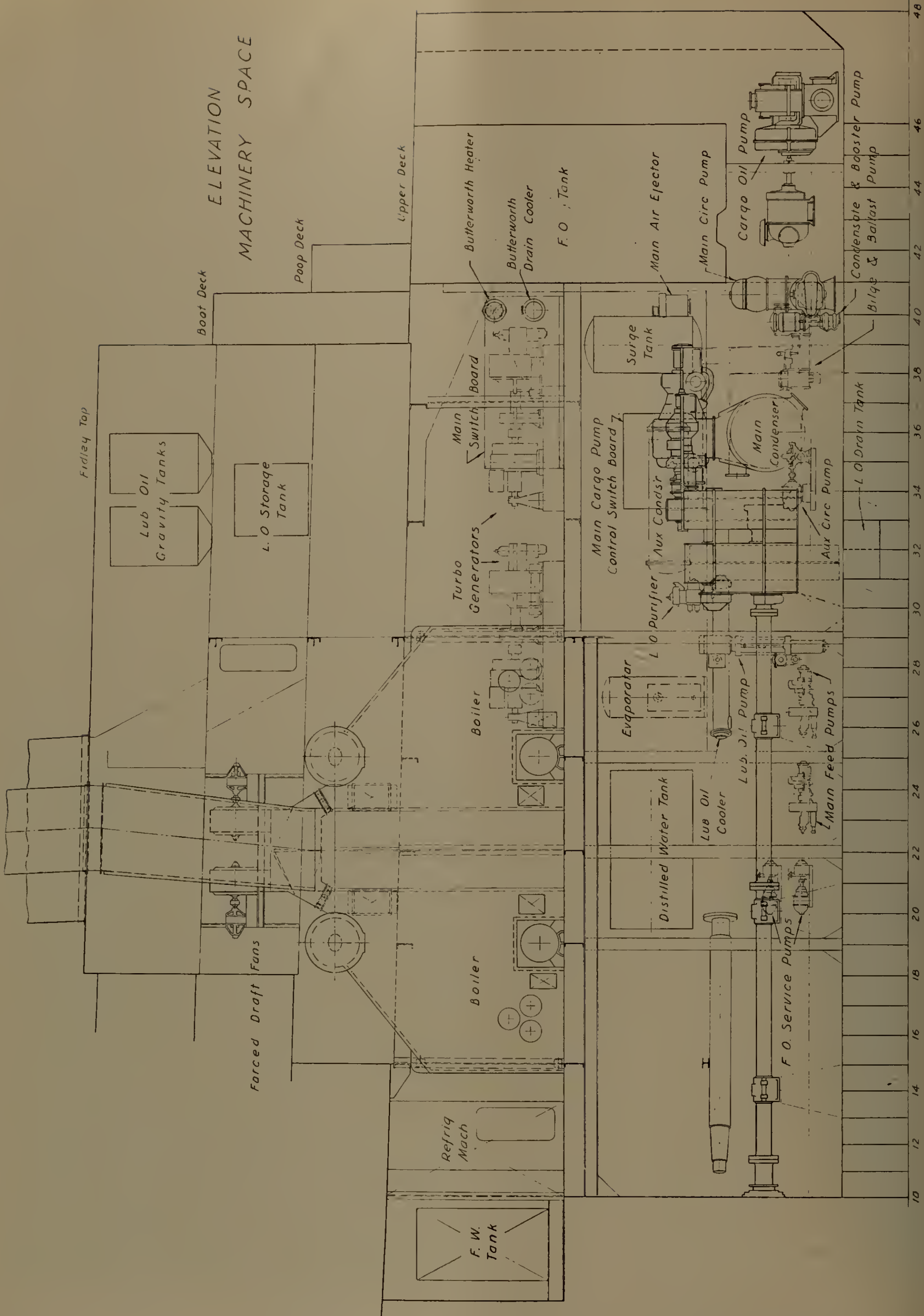
As a result of this test, this new type of construction is being used for the first time on these four tankers. Due to its simplicity and ease of construction, the round-bar type of connection was selected as preferable to the U-shaped plate. All longitudinals throughout the hull (excepting at the ends, where transverse framing is used), on bottom, sides, and deck, consist of bulb angles graduated in size in accordance with the head on them. These are cut at bulkheads and the round-bar connection, just as described above, is employed, being welded to the bulkhead plating and to the bulb of each part of the longitudinal. Hence, a practically continuous structure is obtained. Transverses are notched out around the longitudinals, and round-bars reinforcements are fitted at the points of support, and to provide a longitudinal member in which the stresses are approximately equal throughout its length. All transverses are equidistant from each other and from bulkheads, three transverses between each pair of transverse bulkheads. This feature makes for easy and rapid fabrication of structural parts, since a great many units are exactly alike.

This type of framing possesses the very valuable attribute of being the lightest framing, for a given strength, yet found. Actual calculations for these vessels show a marked saving of weight with this system over conventional framing. In these days of competition saving of weight assumes a position of more importance than ever, since weight saved means deadweight gained.

● Frear Fluted Bulkhead Plating.

Mr. Frear has developed a method of bulkhead construction which is used for the first time on these tankers, and which also economizes in weight and in ease of construction. This system employs a special

General construction view from aft.


ELEVATION
MACHINERY SPACE
Fidley Top
Boat Deck
Poop Deck
Upper Deck
Butterworth Heater
Butterworth Drain Cooler
F.O. Tank
Main Air Ejector
Main Circ Pump
Cargo Oil Pump
Condensate & Booster Pump
Bilge & Ballast Pump
Lub Oil Gravity Tanks
L.O Storage Tank
Main Switch Board
Surge Tank
Main Cargo Pump Control Switch Board
Main Condenser
L O Drain Tank
Aux Condsr
Aux Circ Pump
Turbo Generators
L O Purifier
Evaporator
Boiler
Lub. Oil Pump
Main Feed Pumps
Distilled Water Tank
Lub Oil Cooler
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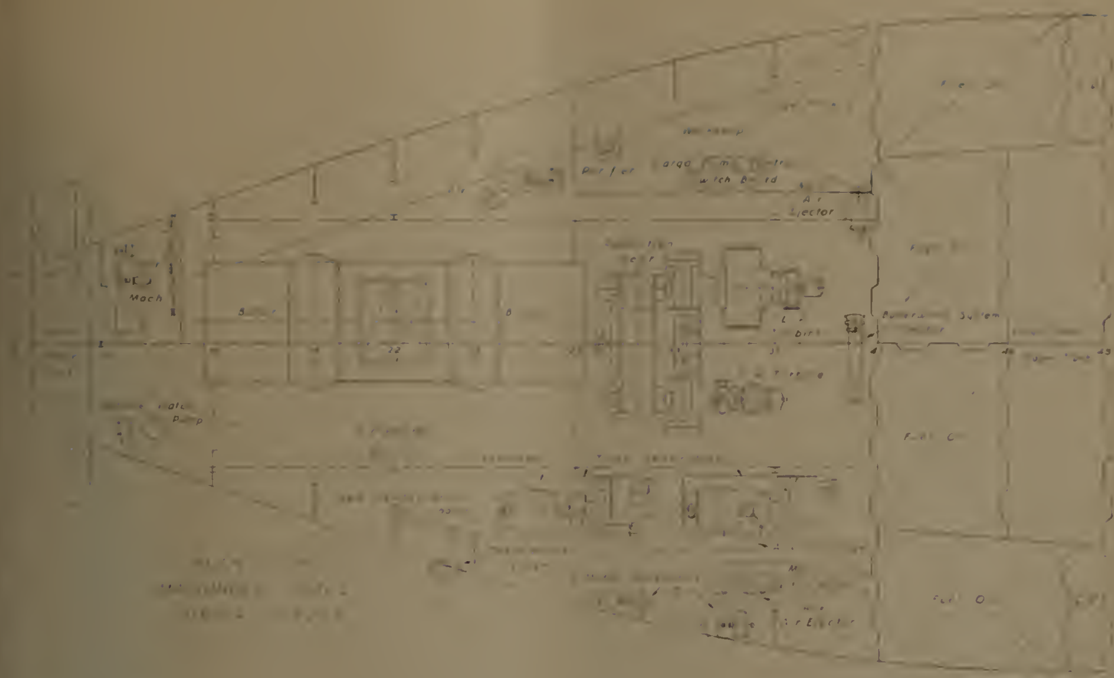
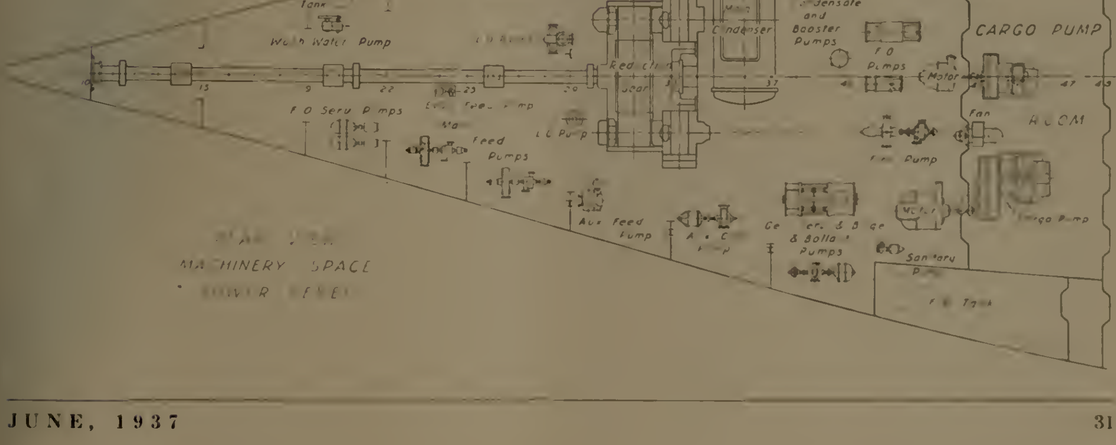


"fluted" bulkhead plating, in which each plate is pressed by machine, in one operation, to a trough-like section the long way of the plate. This trough is three feet wide at the top, two feet wide at the bottom, and eight inches deep, and is made near one side of the plate, leaving the remainder flat. The fluting is uniform across the entire bulkhead, spaced at $5\frac{1}{2}$ foot intervals, and the original plate width is adjusted to suit, so that each pressed plate forms one complete, finished unit ready to assemble. Plate joints are welded, with a two-inch overlap.

This fluting of the bulkhead plating does away with the necessity for separate bulkhead stiffeners, since the plate itself, by its shape, provides local stiffness and requires a minimum of outside support. The only supports actually required for these fluted bulkheads are simple and easily built plate webs normal to the fluting, and approximating the webs which would be



fitted in addition to stiffeners in the usual type of bulkhead construction.

In transverse bulkheads, the fluting runs vertically, and three horizontal webs are fitted in the entire depth of the hold. For longitudinal bulkheads, the fluting runs fore and aft, and the three transverses between each pair of transverse bulkheads form the bulkhead supports.

This system of bulkhead construction possesses several inherent advantages. In the first place, it is light, and thus results in additional paying deadweight for a given displacement. Secondly, it presents a smoother and greatly reduced surface for cleaning or subject to corrosion. Also, since the sides of the fluting all slope, it is, to the greatest possible extent, self-draining.

This combination of framing and bulkhead construction, both of which are lighter than those of customary design, permits the use of heavier scantling than usual, with extra thickness of metal in those parts in which corrosion is most active, thereby minimizing repair expenses and prolonging the life of the vessel. However, since the greater part of the weight saving still remains for use to increase the deadweight carrying capacity, we have a vessel of extremely high deadweight ratio, in this case expected to be the highest yet obtained on any large tanker, and, at the same time, greater strength and greater margin against corrosion, than customary construction. Since corrosion is a very real factor in the life of bulk oil carriers, the benefit to the shipowner of this additional protection, while still saving weight over normal construction, will be at once apparent.

● Hull Details.

Transverse framing of customary form is used at both ends of the vessel, forward of the cargo tanks and in the machinery space and aft peak. A double bottom will be fitted in the machinery space.

Welding is extensively used on these vessels, riveting being confined almost entirely to the shell plating and upper deck plating amidships. Deck houses and enclosures will also be generally of welded construction.

Interior joiner work will be designed and built by Hopeman Brothers, of New York. Interior bulkheads and partitions, and sheathing on walls and bulkheads and overhead, will consist of fire resisting panels, steel faced for bulkheads, partitions and wall sheathing.

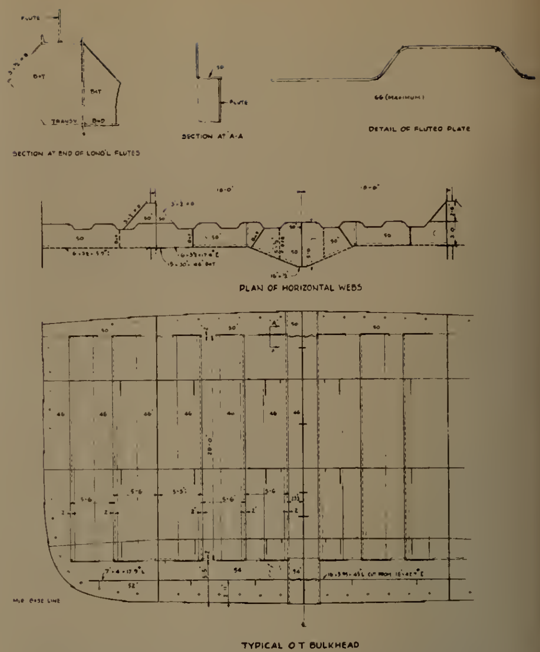
Metal studding and furring will be used, and panel joints will be sealed and covered by metal strips. All interior joiner doors will be of metal, and practically all furniture and interior fittings will be of either metallic or fireproof construction.

In the galley and pantries, the deck covering will be of non-slip tile on top of cement. Throughout all other accommodations, the deck covering will be magnesite.

A steel fore-and-aft bridge or catwalk with subway grating panels will be fitted from poop to bridge and from bridge to forecastle.

● Outfit and Equipment.

Navigating outfit on these four tankers will be modern and complete. In addition to the usual standard compasses, complete Sperry gyro-compass equipment with master compass and three repeaters will be installed, also Sperry gyro-pilot automatic steering control. A fathometer and an electric sounding machine will be provided, and a continuous, three-day, course recorder. Complete radio equipment will be installed, including a radio direction finder and antennae system with plug-in connections in each room of the accommodations.



Elevation, plan and details of Frear fluted plate bulkhead.

Engine and docking telegraphs will be of mechanical type, as usually supplied to merchant vessels.

Electric revolution indicators and helm angle indicators will be installed, both having repeaters in the wheelhouse.

Four 22 ft. 0 in. by 7 ft. 6 in. lifeboats, each of 31 person capacity, will be furnished, two amidships and two aft, on hand-operated mechanical davits.

Mechanical ventilation, designed for fifteen changes of air per hour for each space supplied, will be fitted for living quarters in the poop and poop house. The cargo pump room will have a motor-driven fan supplying ten changes of air per hour. Other spaces will be fitted with cowl ventilators or other means of natural ventilation.

The two bower anchors for each ship will be of the stockless type, weighing 10,045 pounds each. A spare bower anchor, of 8,540 pounds weight, and one 3,605 pounds stream anchor, both stockless, will be supplied. Anchor chain will be 2¼ in. stud link cable. Two ships will have cast steel chain, while forged steel chain will be supplied for the other two.

Steering gear, windlass, and deck winches will all be steam driven, of American Engineering Company manufacture. The steering gear, specially built for

these vessels, will be of the spring-quadrant type with hydraulic telemotor control from the bridge, with alternate electric control by the gyro-pilot. The windlass will be a horizontal, compound geared unit, having two gypsies and two wildcats. It will be capable of handling the two anchors simultaneously or separately. Three 9 in. x 12 in. compound geared winches will be fitted. One of these will be located forward, where it may be used for handling cargo in the dry hold; one will be amidships, and one aft, the latter being arranged for emergency steering as well as for warping.

A five ton boom will be fitted on the foremast, serving the dry cargo hold. Amidships, there will be two king posts, each having one 4-ton boom and one 2-ton boom. Two tubular steel masts will be fitted.

The Butterworth system of tank cleaning will be installed. Tank vents will be led up the masts, vents from six tanks running into one 8 in. riser. Butterworth pressure vacuum valves and Oceco-Flame arresters will be used on these vents. Vacuum and pressure gages for each tank will be installed in the bridge space.

● Propulsion Machinery.

The machinery installation, while taking advantage of the increased efficiency and weight saving possible with the use of reasonably high pressure and high temperature steam, is conservative in design and characterized by simplicity and dependability.

The steam generating plant will consist of two Foster-Wheeler "D" type, two drum, water tube boilers with economizers, superheaters and desuperheaters. The boilers will be fitted with Todd oil burners and will be arranged for operation under forced draft. They will be located on a flat, in the machinery compartment, above and aft of the propulsion unit.

The two boilers, at normal rating, will provide steam for normal full power operation of the propulsion equipment. Sufficient overload capacity, however, is available to permit simultaneous operation of the Butterworth tank cleaning system.

Superheated steam at full boiler pressure will be supplied to the main turbines and, normally, to the generator turbines. Desuperheated steam at full boiler pressure will be supplied to the turbine driven main feed pumps, turbine driven fire and Butterworth system pump, reciprocating auxiliary feed pump and to the generator turbines. Reduced pressure desuperheated steam will be supplied for all other services. Provision will be made for operating generators and other necessary auxiliaries with low pressure shore steam when in port with boilers secured.

The main propulsion unit will consist of one high pressure and one low pressure turbine, of the latest Bethlehem Shipbuilding Corporation design, driving the propeller through Falk gears. The unit is designed to deliver 3500 shaft horsepower at 85 R.P.M., utilizing 375 pounds gage pressure and 725° F. total temperature steam to turbines, with 28¼ inches Hg. vacuum at exhaust flange.

The high pressure turbine will be of the combined impulse and reaction type and the low pressure turbine of the single flow reaction type. An astern turbine, capable of developing ample torque for maneuvering the vessel, will be fitted in the low pressure ahead casing.

Connections, with the necessary fittings and portable pipe, will be provided to permit operation of either turbine singly in event of an emergency.

The main reduction gear, manufactured by the Falk Company, will be of the double reduction, double helical tooth, articulated type. The gear case will house also the Kingsbury main thrust bearing and will mount a reversible motor driven turning gear.

The low pressure turbine will exhaust downward to the main condenser installed athwartship beneath the turbines. Main and auxiliary condensers will be designed and constructed by Bethlehem.

During operation at sea, the main condenser will handle main turbine and generator exhaust steam together with any excess auxiliary exhaust admitted under control of an automatic exhaust back pressure valve, and the auxiliary condenser will be normally secured. In port the auxiliary condenser will receive generator turbine exhaust and will handle any excess auxiliary exhaust admitted through an automatic back pressure valve.

● Power Plant Auxiliaries.

Motor-driven Worthington circulating pumps will be installed for condenser service; one vertical unit for the main condenser, and one horizontal unit for the auxiliary.

Foster-Wheeler main and auxiliary air ejectors will be provided for removing air from the condensers. The main unit will be of the twin two-stage type and the auxiliary unit will have two single stage jets.

In the interest of obtaining complete deaeration of boiler feed water, a totally closed feed system will be installed.

Two Worthington combined motor-driven condensate and condensate booster pumps, arranged to take suction from either condenser, will be provided. The booster pumps will discharge through air ejector inter and after condensers, feed heater drain cooler and feed water heater to the feed pump suction line. A closed surge tank, provided with a vacuum connection to the condensers, will be connected to the common condensate discharge and booster pump suction line.

All steam drains are collected and eventually pass through the condenser to provide as complete deaeration as possible.

Two Worthington main feed pumps, close coupled to Sturtevant driving turbines, and one Worthington reciprocating, steam-driven auxiliary feed pump will be provided. Each main pump will deliver water at a rate sufficient for simultaneous overload operation of two boilers.

One feed heater, with a drain cooler, will be provided in the booster pump discharge line, and will use auxiliary exhaust steam replenished by bleeder steam from the main turbines.

The main turbine lubricating oil system will be of the gravity type. One Northern rotary, motor-driven oil pump will draw from a sump tank under the reduction gear case and discharge, through a lubricating oil cooler, to the oil supply line to bearings and oil sprays. A gravity tank will be connected in the supply line to provide for constant pressure and for reserve

supply in emergencies. Gravity tanks and lubricating oil coolers will be supplied in duplicate, one of each for standby, and a Worthington vertical simplex steam pump will be fitted as a standby service pump.

One 150 gallon per hour DeLaval Unimatic lubricating oil purifier, with a separate steam heater, will be provided for continuous or batch purification of oil.

Two Sturtevant Silentvane motor-driven forced draft blowers, mounted above the boilers, will draw warm air from the top of the machinery space and discharge downward, through the boiler casings, to the burners. Each fan will be capable of supplying air for normal simultaneous operation of two boilers but, during overload operation, one fan will be required with each boiler.

Two Northern rotary motor driven fuel oil service pumps and two fuel oil heaters will be provided; one of each will be capable of serving two boilers during overload operation, the other units being secured. A Wothington horizontal duplex steam pump in the engine room will be arranged for fuel oil transfer duty and as a standby for the service pumps.

Automatic controls are to be furnished, in connection with the air and oil services for the boilers, to provide for maintaining uniform steam pressure, to insure correct fuel-air ratio for proper combustion, and to minimize attention required from operating engineers. Thermostatic control of the fuel oil temperature will be provided.

● **Electric Power Plant.**

Electric power service for the vessel will be supplied by two 240 volt D.C. Westinghouse geared turbogenerator sets and distributed through a Westinghouse main switchboard.

Two General Electric 230/120 volt motor generators will serve the lighting system.

General Electric motors and controls will be furnished for motor-driven auxiliaries in the engine room and for cargo pumps.

● **General Service Auxiliaries.**

Worthington pumping equipment will be provided for all water services. One centrifugal fire pump, driven by a Winton turbine, one centrifugal motor-driven general service and ballast pump, and one motor-driven centrifugal sanitary pump will be installed in the engine room, together with two motor-driven plunger units for potable water and wash water hydropneumatic service, one horizontal duplex steam-driven general service and ballast pump, and one horizontal duplex steam-driven evaporator feed pump. A vertical duplex steam-driven fire, bilge and ballast pump will be installed in the forward pump room.

Worthington duplex steam pumps will be provided for fuel oil transfer; one vertical unit for the forward pump room, and two horizontal units in the engine room.

An evaporator and distiller will be fitted in the engine room and arranged for making potable water from sea water and for pre-evaporation of raw feed water.

A motor driven gland exhauster, with condenser, will be fitted to serve the main turbine glands.

Workshop tools will be installed on a flat in the engine room. A Rahn-Larmon heavy duty lathe, a Sibley vertical drill press, and a Hisey-Wolf double wheel floor grinder, with individual motor drivers, will be provided.

Compressed air for automatic controls, air operated tools, and other miscellaneous services will be supplied from an air receiver charged by a Worthington motor-driven compressor with a standby connection from a Westinghouse steam-driven compressor.

Refrigerator spaces for food storage will be cooled by a Carrier Brunswick direct expansion ammonia plant. This plant is designed to maintain suitable storage temperatures in the ship's stores, refrigerators and to cool drinking water for the crew. The plant is operated under manual control with the exception of the vegetable compartment, which has automatic control. A scuttle butt will be installed to supply cool drinking water in the machinery spaces and after crew's passageway.

Our Merchant Marine

(Continued from page 21)

this business there is competition in personnel as well as in management. If we are to compete, the men who man the ships must be loyal and disciplined in the finest traditions of the sea.

● *The Public Interest.*

Every American must view commercial independence and national defense as primary ends of his government. The public, most of all, must appreciate that an adequate merchant marine is the only way in which we can avoid risks to our commerce when home needs call back foreign ships from their normal routes. The fear of extortionate rates or other discriminations cannot worry the American shipper when we possess our own merchant shipping.

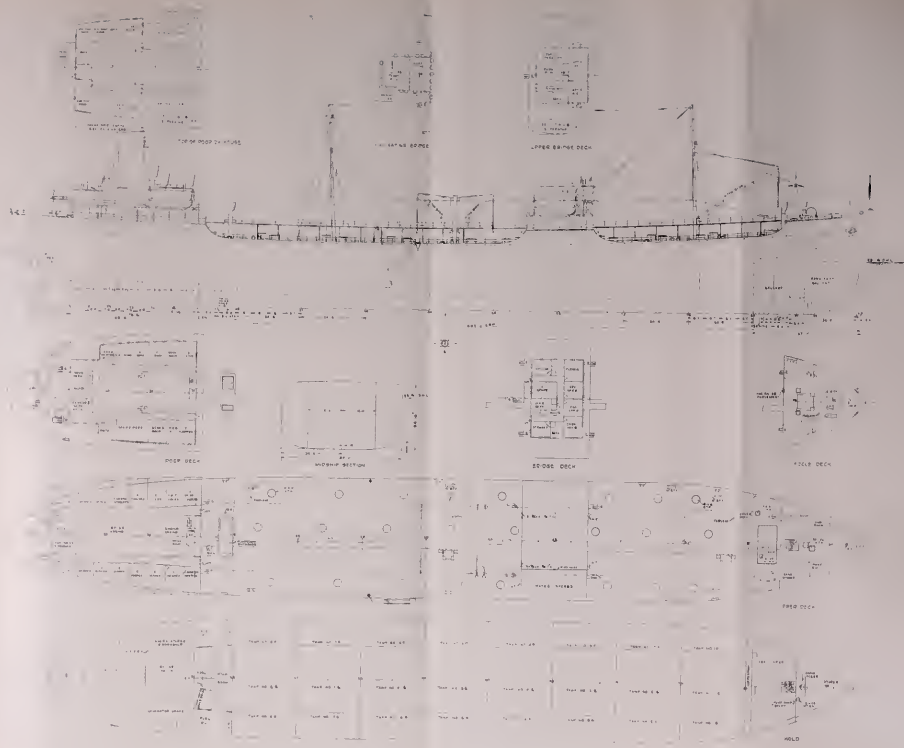
In turn, as we attain the kind of merchant marine we want, the public as shipper and passenger is bound in plain intelligence to support it. This is true whether we rely upon the obligations of patriotism or the dictates of common sense. It is the height of nonsense for us, as a people, to subsidize our vessels through taxation while, as a people, we patronize exclusively the ships of our competitors.

This present law is, I am confident, adequate to the aims of the American people. The Maritime Commission, I pledge now, will administer this law impartially, fairly, and sympathetically. It expects the fullest measure of honest and forthright cooperation from the operators and shipbuilders, from labor, and from the public.

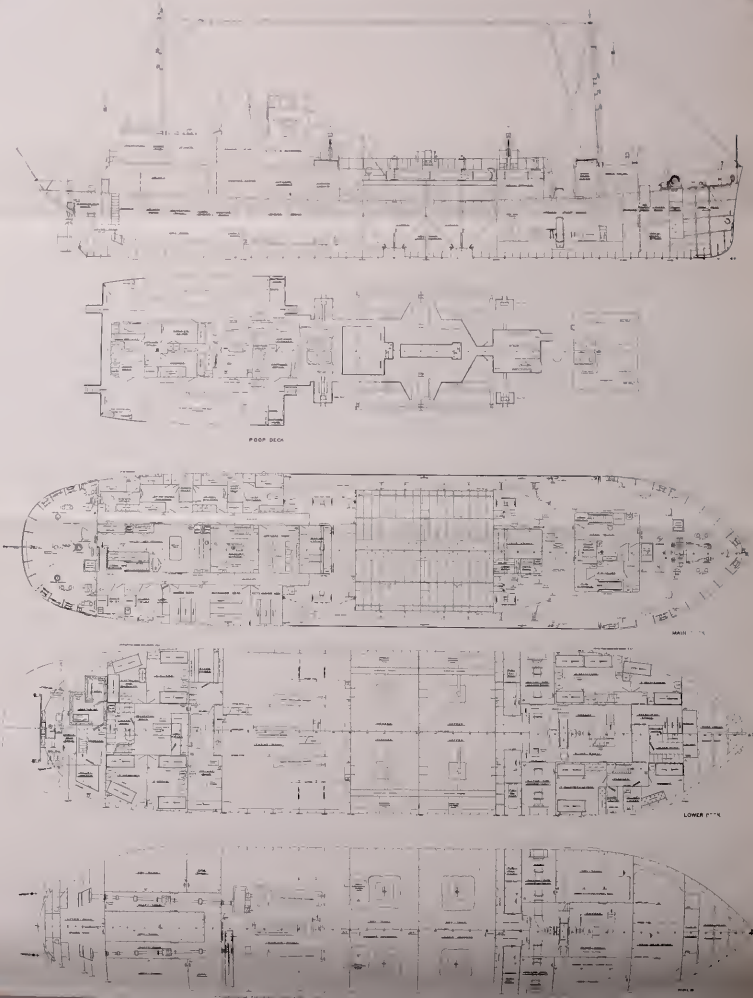
Here we are emerging magnificently from the greatest depression in history. *Courage* and *confidence* should be our passwords.

Let me put to everyone this final question: "Will the dream of a quarter of a century become the reality of tomorrow—shall we have a merchant marine worthy of the title 'American.' "

[Abstract of address before Propeller Club of the United States, New York, May 21st, 1937.]



Outboard Profile and Deck Plans of Tankers now Building for Standard Oil Company of New Jersey, on the new Frear-Bethlehem System of Framing with Frear Fluted Plate Bulkheads.



POOP DECK

New Shallow Draft Seagoing Dredge "Pacific"

Union Plant of Bethlehem Building Suction Hopper Dredge with Many New Features for the U.S. Army Engineeers

The steel seagoing hopper dredge Pacific, now under construction at the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., is rapidly nearing completion and will be finished late in July.

This dredge is being built to conform with the American Bureau of Shipping rules for Class A-1 in this type of seagoing construction, and her equipment for navigation, safe working conditions, and safety in sea emergencies will exceed the latest requirements of the Bureau of Marine Inspection and Navigation.

The Pacific is a seagoing hopper dredge of the twin-screw, twin-rudder, side-pipe, all steel type, with the following general characteristics:

Length overall	180 feet, 3 inches
Length B. P.	168 feet, 0 inches
Beam	38 feet, 0 inches
Depth amidships	14 feet, 0 inches
Draft, light, forward	4 feet, 8 inches
Draft, light, aft	7 feet, 8 inches
Draft fully loaded, mean	10 feet, 10 inches
Displacement, light	842 tons (long)
Displacement, loaded	1580 tons (long)
Propulsion power	800 S.H.P.
Propellers	2
Speed, light draft	9.5 knots
Speed, loaded draft	9 knots
Fuel tank capacity	300 bbls.
Cruising radius	2200 nautical miles
Complement:	
Officers	11
Men	27

(Notes: As given in above table, light draft is for hopper gates open, fuel and water aboard; loaded draft is for 500 cubic yards of sand in hoppers and full load of fuel, water, and stores; and complement is for three shift, two dragpipe operation.)

● Hull Construction.

The hull and superstructure of dredge Pacific is entirely of steel, wood construction being limited to furniture. Compartment division is so arranged that the dredging pump room is forward of the hoppers. This layout provides a satisfactory and logical location of engine room, hoppers, crew's quarters, and dragpipes with their operating equipment. For a dredge of this size the arrangement of compartments on the Pacific is considered ideal.

Alloy steels of special characteristics are used for all hull and dredging machinery parts where their use is indicated by the conditions of service. This treatment includes all parts of the hull exposed to special wear, and the inclined sides and ends of the hoppers. These surfaces are of one piece plate construction and with welded fastenings to prevent leakage.

This use of alloy steel has resulted in considerable weight saving, a very necessary consideration in the design of this light draft vessel.

Stern frame and stern are of nickel steel castings furnished by the Columbia Steel Company.

Many of the castings required for fittings to the hull and machinery of the dredge Pacific will be subjected in use to pressure, strain and shock, and so need to be of special strength. Wherever this is the case, the specifications call for special alloy steels. A number of these castings were supplied by the General Metals Corporation of Oakland, California, who maintain a foundry, also a metallurgical laboratory, specializing in carbon steel castings, also alloy steel casttings.

● Propulsion Machinery.

The two propulsion power units are eight cylinder directly reversible medium speed Winton diesels, each developing 400 shaft horsepower at 450 revolutions per minute. Each of these engines is connected to one of the propeller shafts through a hydraulic coupling furnished by the Hydraulic Coupling Corporation and mechanical reduction gear furnished by the Farrell-Birmingham Company. When the engines are running at 450 r. p. m. the propellers turn 130 times a minute.

Propellers for this type of service demand special design. They must deliver strong towing effort at the customary dredging speeds of two or three knots, and efficient propulsive efficiency at nine knots. As the propellers must not only take care of the water resistance to the progress of the hull, at slow speeds and often against strong tidal currents, but must also overcome the draghead resistance on the sand or mud bottom, they are designed along approved towboat practice, resulting in four bladed wheels, 7 feet 6 inches in diameter and with 9 feet 6 inches pitch.

Cutless rubber bearings are installed in the stern tubes and struts, and between the strut and the stern tube each shaft runs in a steel watertight tube to prevent sand laden water from entering the bearings. Water lubrication for these rubber bearings is provided by the discharge of the circulating water cooling system. This method assures forced lubrication of these bearings whenever the engines are running. Between the after end of the struts and the propeller bosses the shafts are protected by steel plate rope guards.

A fresh water cooling system is installed to take care of the cylinders of all the diesel engine units on

the ship except the 10 kw. emergency generating set, which is radiator cooled. The circulating water cooler was furnished by the Condenser Service and Engineering Company and the circulating pumps by the Nash Engineering Company.

Wrought iron was specified for many uses on this dredge. Genuine wrought iron plates were used for: Two portable cylindrical fresh water tanks; two tanks for engine circulating fresh water; and one hot salt water tank. Genuine wrought iron pipe was used in: Waste and sanitary piping systems; deck drains; stern tube lubricating system; fire, bilge, engine cooling water, dredger pump priming, and hydraulic gear flushing systems; and hand rails, stanchions, scuppers and ladder rungs in ventilators. All of this wrought iron was furnished by the A. M. Byers Company.

● Dredging Machinery.

A single 18 inch suction dredging pump of the type developed by the U. S. Army Engineers is driven by a directly connected direct current 240 volt General Electric motor with a normal rating of 340 horsepower but with an overload capacity enabling it to run at 425 horsepower indefinitely without overheating. This pump ranges from 210 to 250 r. p. m. On normal operation the pump motor is directly coupled with a 275 kw. 240 volt General Electric direct current generator directly connected to a 400 horsepower 8 cylinder Winton diesel engine. For overload work one of the two auxiliary generating sets will be cut into the motor circuits in parallel with the main dredging power unit. Each of these two auxiliary sets consists of a General Electric 75 kw. 240 volt D.C. generator directly connected to a Winton diesel engine.

Complete dragpipe, suction, and discharge systems are installed on both port and starboard sides of the hull. It is contemplated that the dredge will ordinarily operate with one dragpipe, but choice of either side pipe must be had at all times for efficient work on Pacific Coast bars. Under favorable bar channel conditions and in quiet water operations it may be found practicable to dredge advantageously with both dragpipes at one time, in which case the pump power would be increased as described above.

The dredging pump motor, the priming of the dredging pump, the hydraulic rubber seated valves in the pump suction lines and the check valve in the discharge line from the pump will all be controlled from a station on the deck just forward of the hoppers and at the hopper walkway level. It is believed that the dredging pump will ordinarily be self priming, but a Nash Hy-tor air exhauster priming pump has been provided in the dredging pump room to insure rapid priming under all conditions.

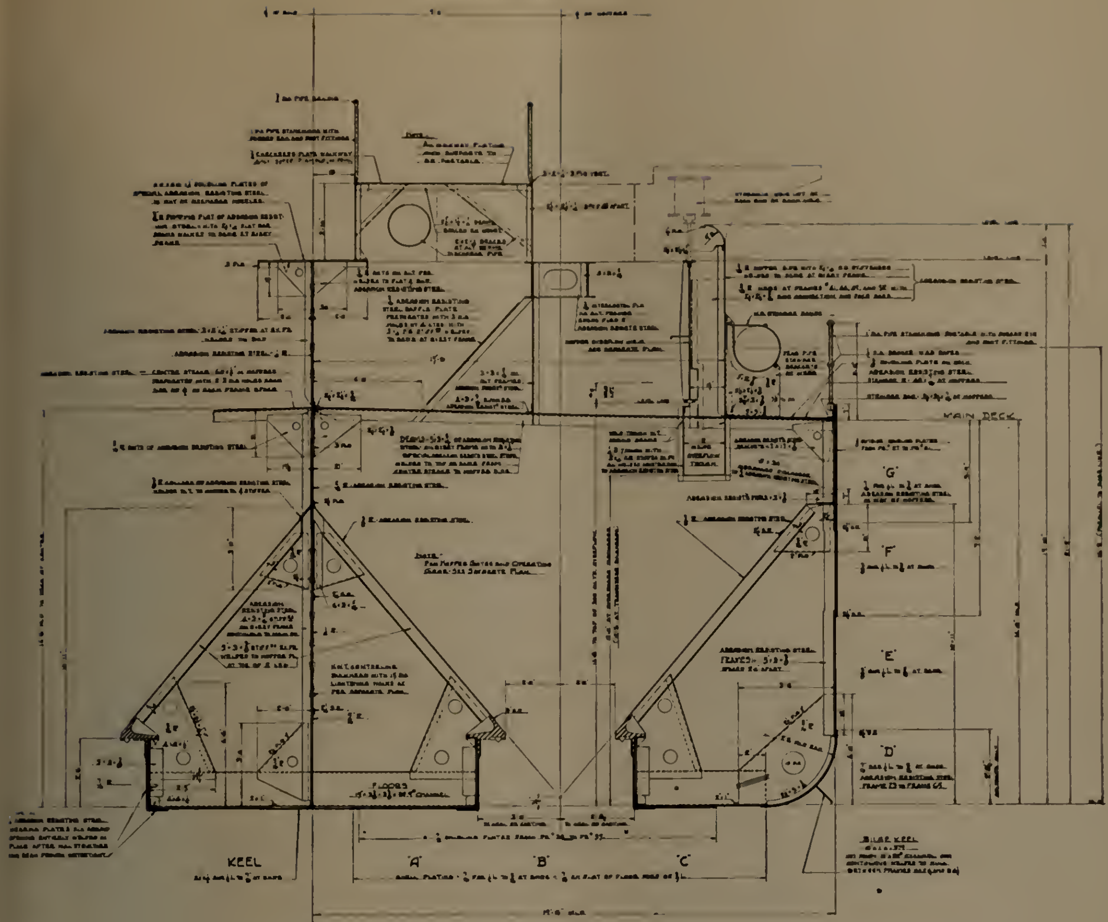
The ball joints on the dragpipes are made tight by a rubber seal. The inner ball is special rubber covered over the working portion of its surface and the outer ball has an insert rubber gasket ring which bears on this rubber surface of the inner ball at all positions of the dragpipe, thereby effectively preserving the seal.

Covering this large inner ball with a special rubber compound vulcanized in place is considered a rather unusual and difficult technical feat. The rubber was provided and applied by the Universal Rubber Corporation of San Francisco, manufacturers of mechanical rubber goods.

Means have been provided for ready connection or disconnection of the dragpipes to the hull inlet fittings and the stowage of the dragpipes on the main deck alongside of the hoppers. This stowage enables convenient changes and repairs to be made to the dragpipe parts, permits better berthing of the dredge, and provides a better seagoing condition for the dredge when transferring between works. A special type of portable stay has been developed for staying the dragpipe elbow at hull inlet.

Dragpipe davits are of the type developed for and used successfully on the dredge Culebra in its Pacific Coast bar work. The after davit has an outboard reach of 8 feet for clearance between draghead end of the pipe and the vessel's side. Both forward and after davits have a special twin spring suspension gear for easing shocks on the gear and both davits hinge inboard for stowage of the dragpipe and themselves.

The assembly bay at the Winton Diesel Engine Company, Cleveland. Among the engines shown here are the units for the Army Engineer's dredge Pacific.



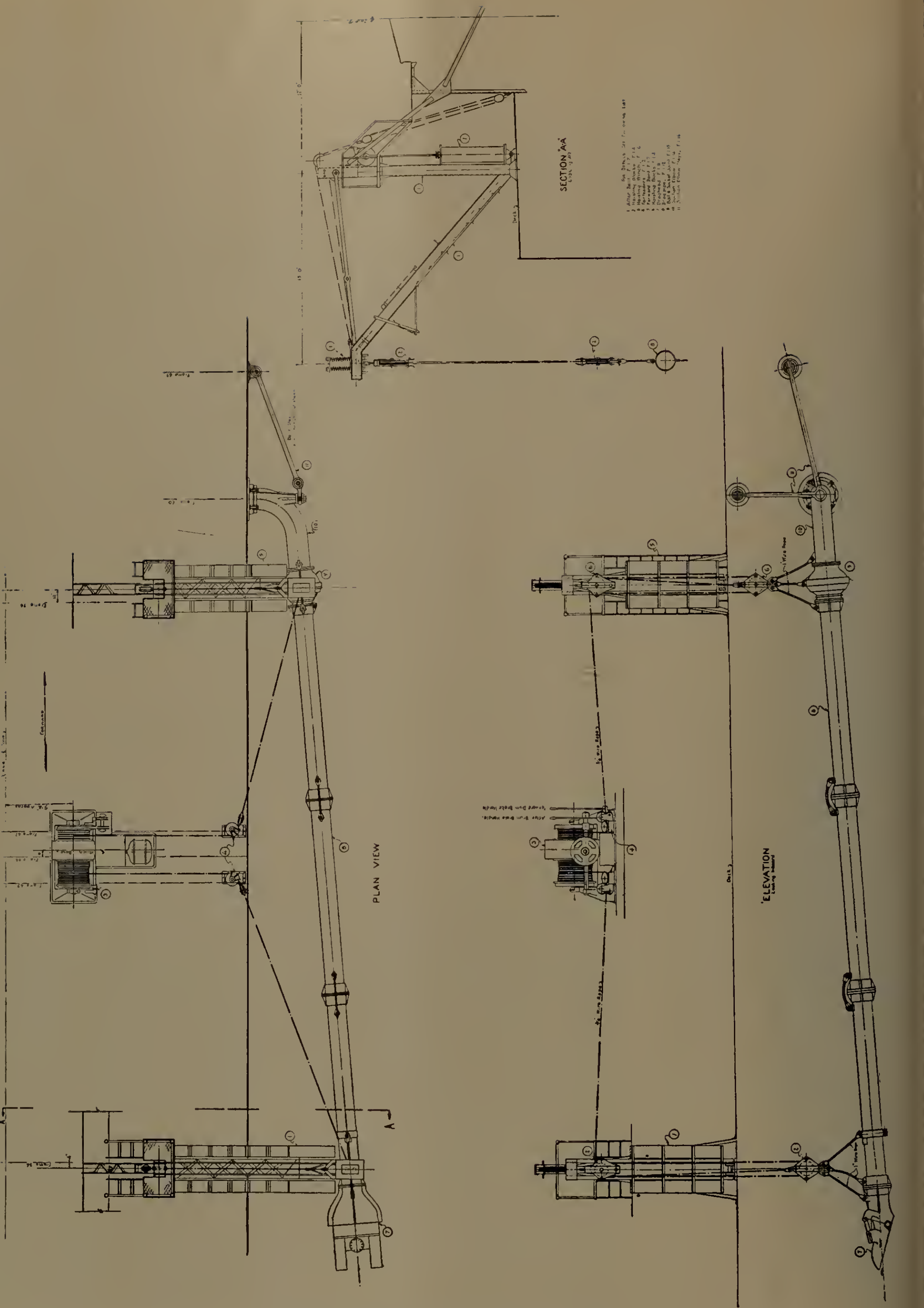
TRANSVERSE SECTION THRU HOPPERS.
Starboard Side Shown—Looking Forward

Davit blocks will be ball bearing, and wire rope slings will be used in lieu of chains for suspension. Hydraulic topping gear for the davits will be installed for safety and reliability in operation. The hydraulic gear for the forward and after davits of a side will be controlled by Critchlow hydraulic valves located at the davits. An auxiliary safety lead is provided for each davit for use when topping is done.

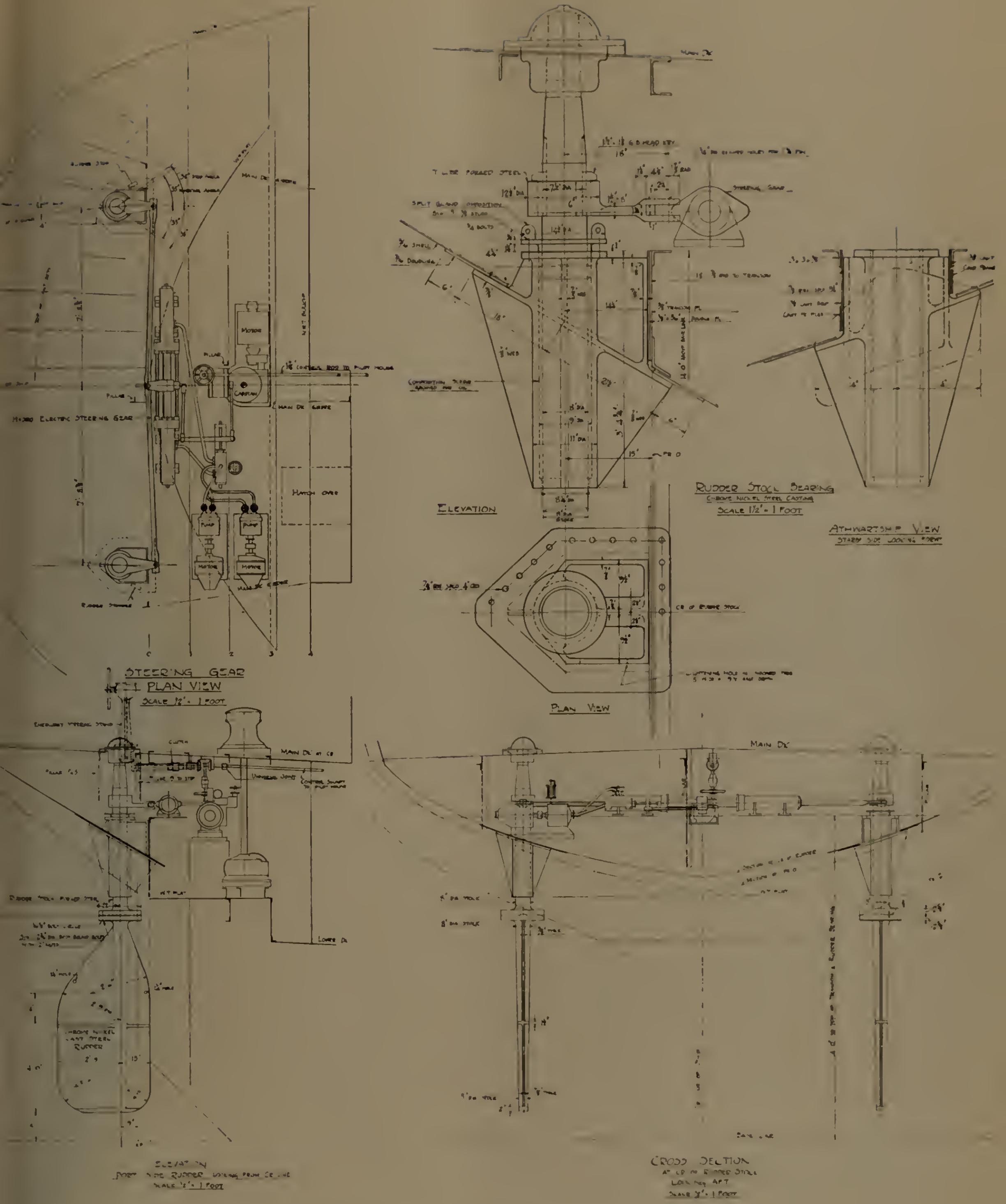
Dragpipe hoisting winches are designed for electric motor drive through worm and worm wheel. The drums are designed with variable diameter to provide straight line dragpipe conditions at all angles of inclination and for even lifting of the dragpipe from its horizontal position in line with the hull inlet center, to its stowage position on the main deck when the pipe is disconnected from the hull inlet fitting. The winches are provided with dynamic braking in all lowering points, with a magnetic brake on the motor shaft, and a hand brake on the hoisting drum proper for additional safety when but one hoist is being attended under single pipe dredging operations. The hoisting winches will be controlled from the dragtenders' cabs.

Located at about the hopper top level these winches are readily accessible from the hopper walkways and from this position satisfactory leads are practicable through fair leader sheaves to the upper blocks of the forward and after dragpipe davits. The winch and the fair leader blocks are designed with ball and roller bearings to reduce friction. Speed of lift of the draghead off the bottom is about one half foot per second, or about 100 feet per minute on the main winch drum lead.

The hopper capacity is changed from 300 cubic yards to 500 cubic yards by lowering the weir gates provided at the hopper sides and thus changing the hopper overflow level from under the weir gates to over them. These weir gates are made watertight by rubber strip sealing devices, and each weir gate is provided with two small readily opened gates for emergency discharging of a part of the load when the dredge is grounded under the 500 cubic yard loaded conditions. The weir gates are operated hydraulically. Racks, gears and a connecting shaft provide assurance of even lift for each weir gate.



Plan, Elevation and Section of Dragpipe Assembly.



Plans, Elevation and Details of Rudder and Steering Gear.

The hopper dump gear is of the standard hinged individual gate and vertical ram type and is hydraulically operated from cylinders at the hopper walkway level. Hydraulic power for all purposes except the steering gear is provided by an electric drive hydro-pneumatic plant installed in the engine room. Oil is used for the hydraulic fluid.

A depth indicator to show the dredging depth below bottom of dredge at all times will be provided on port and starboard sides in view of the pilot house and the dragtenders' cabs. The indicators are fitted with a movable scale which may be readily adjusted for various project depth settings and for draft and tidal stage corrections. Liquid draft gage dredging indicators are fitted in each dragtender's cab.

Pilot house and bridge are combined in one structure of the totally enclosed type on account of the generally severe climate in which the dredge will operate. The deck officer will have a complete view of all of the dredging operations from the bridge, which is also well located for navigating and ranging-in the vessel when dredging. Engine room telegraphs are provided in the pilot house and one each at the port and starboard bridge ends. Large voice tubes are provided for direct communication between the bridge and the dragtender's cabs below.

Included in the equipment on the bridge are: Compasses and a barometer and a chronometer furnished by Louis Weule and Company; a clear vision screen furnished by the Chas. Cory Corp.; a rudder indicator furnished by the Sperry Gyroscope Company; a steering telemotor furnished by the American Engineering Company; a Sperry searchlight; and complete receiving and transmitting radio equipment.

The twin rudders are operated normally by an American Engineering Company hydro-electric steering gear as shown in the drawings herewith. A spare motor and pump are installed and connected up for immediate changeover in case of emergency. Tillers and emergency relieving tackles are also provided for main deck operation. The main deck aft is fitted with an American Engineering electric capstan for warping, emergency steering, and other purposes. On the forecastle is mounted a Hyde electric motor-driven windlass.

The deck plans reproduced herewith show the arrangement of spaces; for living rooms of officers and crew; for galley and mess rooms; and for refrigeration and dry storage spaces. A very interesting feature is the use of stainless steel, in "Diamondette" non-skid pattern on the galley floor to get away from the great weight of ordinary steel deck plus cement and tile construction. Stainless steel is lavishly used for dressers, cupboards and other galley furnishings and trim. and the sinks are of Monel metal.

The galley range is the famous Ray Oil Burner, built in San Francisco. The refrigeration system for galley perishable stores is furnished by Carrier.

In all of the officers' and crew's quarters all inside surfaces of steel exposed on its outer surface to sea or weather is heavily insulated with cork board.

In the machine shop on the flat aft of the engine room there will be installed: A Peerless Machine Company electric motor-driven hack saw; a United States Electric Tool Company motor-driven grinder; a Buffalo Forge Company electric motor-driven drill press; and a South Bend Lathe Works electric motor-driven engine lathe.

A 10 kw. Buda diesel electric generating set, radiator cooled, will be installed in the engine room exhaust hatch at the poop deck level for emergency and port service.

Design for safety of crew and ship is as complete and elaborate on this dredge as it is on a passenger liner. The watertight compartment division of hull spaces is in excess of that necessary to meet the requirements for trim conditions with any two compartments flooded and with full load of oil and water and 300 cubic yards of wet sand in the hoppers. Even with 500 cubic yards of sand in the hoppers these conditions are reasonably met.

On each side of the hull there is provided lifeboat capacity for every member of the crew. In addition there is provided life raft capacity for the total crew. Life preservers for each man are conveniently stored in crew's quarters, and another full complement of life preservers in two boxes on deck. The lifeboats and the davits from which they will swing are Welin. The life rafts are of Balsa. Hyde Windlass Company furnished the boat hoists.

(Page 59 please)

Self-Contained Low-Pressure Refrigerating Units

A new line of self-contained low-pressure refrigerating units has been announced by Carbondale Division of Worthington Pump and Machinery Corporation. These units are designed to employ either freon or methyl chloride as a refrigerant, and are recommended for both air conditioning service and general refrigerating purposes.

The compressor unit is compact, mounted on a sturdy welded steel base, and requires small floor space as well as low head room. To meet modern operating requirements, both suction and discharge valves are the well known light-weight, quick-acting, Feather type. V-type compressors, from four to eight cylinders, depending upon the capacity, are made of a special metal, combining extra strength and great density. Bearings and eccentric rod are bronze.

Electric motor drive to the compressor is the well known Multi-V-Drive. A self-adjusting motor bedplate maintains proper belt tension at all times, except on the eight-cylinder unit, which has adjusting screws for the motor baseplate.

Safe operation is assured by inter-locking the motor starter, and the high-pressure cut-out. Starting is accomplished by means of pressure or temperature changes, and uses the usual automatic starting features.

The receiver is integral with a shell-type condenser which is fitted with copper-finned condensing tubing and is of welded construction throughout.

Panama Canal Zone Notes

By F. H. Langworthy, *Acting Administrative Assistant*

Due to return to normal operation in United States intercoastal trade, which suffered particularly during the recent maritime strike, Panama Canal traffic during the month of March reached a record total of cargo tonnage passing through the waterway, while transits were the highest since October, 1929. The net tonnage, Panama Canal measurement, was only 26 tons less than the record for that feature established in January, 1929, and tolls reached the highest total since January, 1930.

The cargo tonnage which passed through the waterway totaled 3,016,418, the highest of record. Transits amount to 536, as compared to the peak of 554 in October, 1929, and net tonnage amounted to 2,770,451, only 26 tons less than the record established in January, 1929. Tolls collected totaled $2,355,149.04, the greatest since the $2,359,043.09 mark of January, 1930.

The gain in cargo tonnage made during the month in United States intercoastal trade was particularly marked in the movement from the Atlantic to the Pacific, 383,054 tons, the largest of any month since the opening of the Canal. There was also a sharp increase in the westbound movement in the trade between the United States and the Far East, due in a large measure to heavy shipments of scrap metal to Japan. Heavier shipments in iron ore and nitrates from the west coast of South America to the east coast of the United States also contributed to increase in the month's traffic.

Panama Canal traffic during the month of March, 1937, in comparison with the record month of January, 1929, is shown in the following table:

	March, 1937	January, 1929
Number of transits	536	597
Panama Canal net tonnage	2,770,451	2,770,477
United States net tonnage	1,950,745	2,117,064
Registered gross tonnage	3,280,758	2,469,614
Registered net tonnage	1,943,154	2,121,391
Tolls	$2,355,149.04	$2,501,949.64
Tons of cargo	3,016,418	2,857,629

● Decline in Ship Sizes

A gradual decline in the size of vessels passing through the Panama Canal since the eight-year peak in 1933 is indicated in a study made by the Bureau of Statistics, Balboa Heights, on average tonnages of vessels for the past eight fiscal years.

Since the fiscal year 1933 there has been a gradual decrease in the size of vessels using the Canal, both total traffic and traffic exclusive of tankers shows, although the fiscal year 1936 presents a higher average than in 1929 and 1931.

The average tonnage of all vessels making transits during the year 1933 was 5,479, as compared to 5,455 in 1934, 5,368 in 1935, and 5,207 in 1936. Traffic exclusive of tankers showed the average net tonnage as 5,387 in 1933, 5,298 in 1934, 5,270 in 1935, and 5,129 in 1936. Traffic is segregated as of all traffic and traffic exclusive of tankers in this study because of the relatively higher tonnage of tank ships and the sharp fluctuations of the tankers.

The year 1936 made a rather marked decrease in size of vessels transiting, in comparison with 1935. An analysis covering the six principal routes of trade shows that average decreases occurred in size of vessels in United States intercoastal trade, the trade between Europe and the west coast of the United States and Canada, east coast of the United States and South America, Europe and Australasia, and miscellaneous trade routes. Increases in size of ships was noted in the trade between the United States and the Far East and Philippines.

In the important United States intercoastal trade, which represents about 29 per cent of the canal traffic, exclusive of tankers, the average size of vessels of regularly scheduled lines which use the Canal showed a decrease of from 5,904 average net tons in 1935 to 5,129 in 1936.

The decrease in the average size of vessels using the waterway is attributed to an increasing number of tramp ships transiting each year, which are usually smaller vessels than those of lines whose ships use the Canal regularly. There was a smaller number of tramp vessels using the Canal during the depression years, hence the average size of all vessels was larger in 1933.

Many Employees Spend Lifetime in Lighthouse Service

A recent inquiry has brought to light in a rather striking manner the extent to which the Lighthouse Service is a career or lifetime service, it being found that several employees still on active duty have had between 45 and 50 years' service. The list includes the following employees, each the oldest in point of service in his respective district:

Ole C. Gullikson, engineer, Scotland Lightship, third district, 45 years.

H. Almy, lighthouse engineer, fifth district, 45 years.

Philip L. Cosgrove, Jr., master, tender Ivy, seventh district, 47 years.

E. S. Lanphier, superintendent of lighthouses, eighth district, 46½ years.

Edward Pfister, keeper, Conneaut Light Station, Ohio, tenth district, 45 years.

Patrick H. Garrity, keeper, St. Clair Flats Canal Range Station, Mich., eleventh district, 47 years.

Oscar V. Brown, keeper, Browns Point Light Station, Wash., seventeenth district, 47 years.

Peter C. Nelson, keeper, Point Pinos Light Station, Calif., eighteenth district, 45 years.

(U. S. Lighthouse Bulletin.)

Remler Marine Emergency Loudspeaker System

Recent marine disasters, particularly fires, have emphasized the need for emergency sound equipment for the transmission of orders from the bridge to all parts of the ship.

Rapid advancements in electro-acoustical engineering have made such equipment highly practical and systems are now being installed on all passenger vessels on which lifeboats are stowed more than 100 feet from the navigating bridge, in accordance with new regulations specified in Section 20, Rule 5, Ocean and Coastwise (as amended in the 53d supplement of the General Rules and Regulations of the Bureau of Marine Inspection and Navigation). This regulation requires: the installation of a loudspeaker system whereby the officer on the bridge of a vessel at sea may communicate information or orders to any one of several stations located at various parts of the ship, such as the lifeboat stations, embarkation decks, crew's quarters and public spaces, as required by the Bureau, or to all such stations simultaneously. Any such system to be tested and approved by the Bureau of Marine Inspection and Navigation.

Auxiliary microphones can be installed at locations other than the bridge without disturbing complete communication coverage. This is, of course, particularly valuable in case of damage to the bridge, which may make it necessary to direct operations from another source.

Remler Company, Ltd. of San Francisco, a long established firm with an excellent reputation for the manufacture of first-class radios, broadcast and public address equipment and industrial inter-communication systems, determined to produce a marine emergency communication system that would not only meet the requirements of the Federal bureaus but would also be rugged and powerful enough to be absolutely dependable at sea. (Incidentally, it is particularly fitting that the Remler Company should have undertaken this task—it was originally organized in 1918 to build and install ship wireless!) In order to be sure of reaching their goal, Remler engineers made a very careful study, extending over a period of two years, to determine all the requirements under the rules and to investigate all the existing and proposed systems. As a result of this study, Remler has built a system in which every detail is especially designed to meet the rugged requirements of marine service. The Remler Company is now proceeding with installations of these systems on Federal ships, notably the U. S. Army transports St. Mihiel and U. S. Grant.

This system, as installed, consists of microphones, amplifiers, loudspeakers, switches, relays and the necessary power supply. The loudspeakers are installed in as many locations on the vessel as are needed to insure complete sound coverage of the entire ship. A master microphone is installed at the control equipment on the bridge, and auxiliary microphones may be located at other stations. Thus, on the Army transports, an auxiliary microphone is installed in the Troop Commander's stateroom, which may be used when the "mike" on the bridge is out of use. This automatically connects to provide communication with the troop spaces only. Through this use of auxiliary microphones any part of the Remler Emergency Loudspeaking System may be available for special communication uses when the bridge master control is not in use.

The most valuable characteristics in an emergency loudspeaking system are: flexibility and general usefulness; dependability; ease of servicing. In all three of these features the Remler System is designed to be ideal.

● **Flexibility and General Usefulness**

(1) **Group Switching** is provided on the control panel so that any predetermined group or groups of loudspeaker stations may be selected for any particular announcement. The operation of any group switch automatically turns on the power supply for the system.

(2) A **master emergency switch** is provided, operation of which connects all loudspeakers to the bridge microphone regardless of the setting of the group switches. This switch also automatically turns on the power supply.

(3) **Talk-Back Circuits:** The system provides for "talk-back" circuits, enabling two-way communication between any stations and the bridge. A call button at the talk-back station places the circuit in operation and it immediately comes under the complete control of the officer on the bridge. Orders can be given to or inquiries received from any talk-back point without moving from the main control panel.

(4) **Unit Control.** The entire system is controlled from the one panel board on the bridge.

(5) **The Master Microphone** is an efficient durable unit installed as an integral part of the control panel assembly and need not be handled during use.

(6) **Auxiliary Microphones** can be introduced for convenience in transmitting announcements and orders from locations other than the bridge without disturbing the completeness of bridge control in an emergency.

(7) **Automatic volume control** keeps loudspeaker output constant over wide variation of operator's voice level and distance from the microphone.

● **Dependability.**

The Remler system is designed for absolute dependability, as is indicated by the following special features:

(1) **Separate Circuits.** Every loudspeaker has a sep-

arate two wire circuit connecting it to the amplifier rack. No portion of the hull or of any other wiring system is included in any of these circuits.

(2) **Individual Amplifiers.** Each main loudspeaker has its own individual amplifier, assuring constant power to the speaker.

(3) **Amplifier Unit Assembly.** Each amplifier contains its own input and output transformer, so that it is a completely isolated unit. In case of the failure of one or more amplifiers or loudspeakers there is no appreciable effect on the operation or volume level of the rest of the system.

(4) **Metal tubes** are used to insure ruggedness.

(5) **Push-Pull Tubes:** The last stage of the driver-amplifier consists of two tubes in push-pull connection. Failure of either tube leaves the remaining tube available to operate the system at a slightly reduced power output.

(6) **Corrosion Resistance:** All materials used in construction are especially selected and treated to withstand indefinitely the corrosive action of salt water and salt atmosphere. Metals parts are brass, Monel metal, cadmium plated steel, or treated aluminum. Filter and by-pass condensers are thoroughly impregnated with wax and sealed into metal containers with compound. All transformers have vacuum impregnated windings and are sealed with protective compounds into metal cans. The loudspeakers are constructed to satisfactorily pass the salt spray and salt water tests prescribed by the bureau.

(7) **Power Supply:** A motor generator set is used for power. Normally this is operated from the main electric power supply of the vessel. An emergency power relay automatically switches this set to the ship's emergency generating set circuits if for any reason whatever the regulator electric power supply should fail.

● **Ease of Servicing**

(1) **Line Indicator Lamps:** Each loudspeaker line

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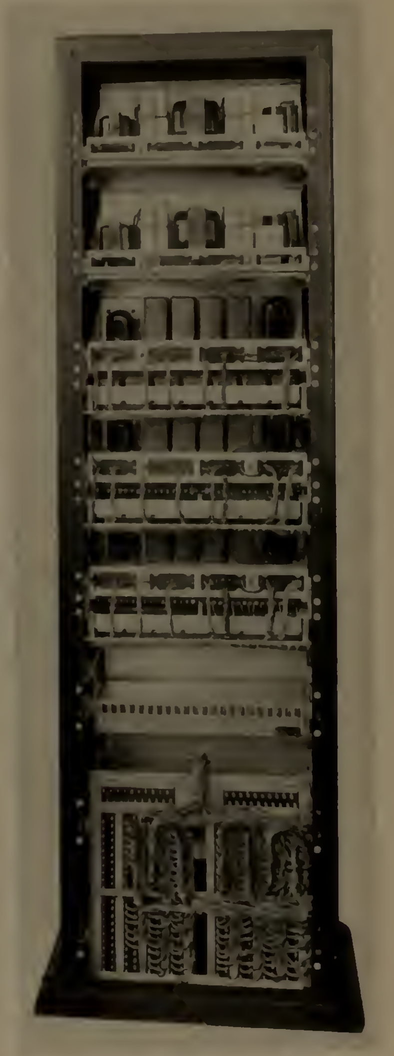

Essential units of the Remler emergency loudspeaker system: Left, control panel; center, loudspeaker cases; right, the back of amplifier case, showing removable units.

Port of Portland Notes

● **Fleming Heads States Line.**

S. P. Fleming, secretary-treasurer of the States Steamship Company for 17 years, was appointed general manager of the company at the same stockholders' meeting at which Kenneth D. Dawson resigned as president and general manager, and W. T. Sexton resigned as vice-president and assistant general manager.

Fleming's new assignment, however, was considered to be more or less temporary, dependent upon a stockholders' meeting to be held in June, when new officers will be elected. Charles E. Dant, Portland lumber exporter, is reputed to hold the balance of power among stockholders.

Although Sexton has steadfastly refused to commit himself as to his future connections, he is expected by his friends to take a position with the International Mercantile Marine Company, of which Dawson is a vice-president and Pacific Coast manager. Sexton has been allied with Dawson and his enterprises for many years.

Helen Sundin, secretary to Dawson at Portland for five years, was also transferred to San Francisco when he left Portland.

● **Inland Chief Arrives.**

Portland's newest and finest river boat, the diesel-propelled all-welded Inland Chief, arrived in Portland May 4 for final mechanical tests before entering upon her career of hauling gasoline and oil up the Columbia and wheat down. Built in Seattle, she is 190 feet long, and has 13 tanks built into her hull for carrying oil and gasoline, and a steel house with a capacity of 800 tons of grain.

Stack of the Inland Chief. F. K. Dent and Gus Krobow standing by.

River men who at first had doubted the feasibility of the new boat were enthusiastic when they visited her at Terminal No. 4. The craft is declared to be easily and quickly turned by her two 600-horsepower diesel motors and three streamlined rudders, and is nearly unsinkable, both of which are necessary factors for successful operation on the upper Columbia.

George B. Gronvold, vice-president of Inland Navigation Company, designer of the boat, and Gus Krobow, architect, were in charge of tests to determine the exact liquid capacity of the tanks. Others present at the maiden arrival of the Inland Chief were: R. S. Whaley, president; F. K. Dent, secretary-treasurer; and Jack L. Hyneman, manager of the company.

The company plans to construct about twelve barges, each 125 feet long, in Portland during the coming year for Columbia River operation with the boat.

Stricken Feltre Reaches Drydock.

Patched under water, refloated, and discharged at

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View of the new shallow draft river cargo boat Inland Chief. She looks ungainly, but is a very efficient and riverworthy craft.

Los Angeles Harbor Notes

● **New Tanker Holds Open House.**

The Los Angeles officials of the General Petroleum Corporation were hosts on May 6 to a group of shipping executives, port officials, and newspapermen aboard the new Socony-Vacuum tanker Mobiloil, docked at the General Petroleum docks, Terminal Island. After an inspection of the vessel a buffet luncheon was served.

Photo by Art Streib, Los Angeles

Officers of the new tanker Mobiloil. Reading from left to right they are: R. D. Lamborne, second assistant engineer; Otto Meyer, first mate; Captain Paul Muller, master; W. N. Arnold, third assistant engineer; Warren Hill, chief engineer; L. A. Masterson, second mate; K. W. Blakeley, radio operator; A. Gordon, third mate.

The tanker Mobilgas, a new sister ship to the Mobiloil, visited Los Angeles harbor on May 17. Both of these ships are on their maiden trips. The Mobiloil loaded a full cargo of Mobilgas at Terminal Island for distribution on the Atlantic seaboard; the Mobilgas took a similar cargo for distribution at Pacific Northwest ports.

These two latest additions to the Socony-Vacuum fleet were fully described in the June, 1936, issue of Pacific Marine Review, and the trials of the Mobilgas were covered in the May, 1937, issue. Each vessel has a capacity for 5,510,000 gallons of gasoline and is powered with a 4,000 shaft horsepower De Laval high pressure double reduction geared steam turbine, which gives her a fully loaded sea speed of 13.5 knots.

Equipped with the most modern aids to navigation and safety, and with steam turbine drive cargo pumps capable of discharging the full capacity cargo in less than twelve hours, these tankers are considered among the most efficient afloat.

Among General Petroleum officials and executives attending the reception aboard the Mobiloil when she arrived in Los Angeles were: A. L. Weil, president; R. A. Sperry, vice-president; A. H. DeFriest, vice-president and general sales manager; A. O. Woll, a director and manager of the marine department; Neil H. Marsh, manager export division; M. D. Leh, assistant general sales manager; A. D. Bennison, manager black oil sales; W. B. Curtis, sales promotion manager; Lloyd Moore, of the marine department; W. C. Lynch, manager personnel department; W. A. Appleford, manager, legal department.

● **Proposed Port District.**

The Harbor Section of the department of harbor, foreign commerce and shipping of the Los Angeles Chamber of Commerce has a sub-committee on port government which has for some time past been diligently studying the combined set-up of the ports of Los Angeles and Long Beach. This sub-committee has now come forward with a recommendation that a large district be formed, comprising not only Los Angeles and Long Beach, but also all that part of Southern California directly benefiting from the service of these two harbors. The harbors under this scheme would be "considered as a single unit, under a unified control, and financed by a port district to a far greater extent than the two municipalities have financed these projects in the past. We are not at present ready to recommend just what the boundaries of such a port district should be. The district might be co-extensive with Los Angeles County, or possibly enlarged to take in Orange County, and parts of San Bernardino and Riverside Counties as well. There is considerable argument in favor of non-recognition of political boundaries in the establishment of such a port district and taking in all of the more densely populated area contiguous to the port and directly profiting thereby."

● **Port Personals.**

J. J. Murray, port superintendent of Associated Oil Company at Los Angeles, was selected on May 6 as chairman of the new board of directors of the Bilge Club for 1937-38, succeeding **Thomas B. Forster**, of the Bethlehem Shipbuilding Corporation. **L. S. Anderson**, marine insurance broker, and **James J. Buntin**, Bethlehem Shipbuilding Corporation, were re-elected treasurer and secretary respectively.

W. K. Sempey, former manager of the Panama Pacific Line office at San Diego, has been transferred to the Los Angeles office of that line as assistant general freight agent, and the San Diego office has been closed.

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Safety at Sea, or S.1916

Senator Copeland's New Bill Threatens to Freeze into a Federal Statute Many Proposals for New Rules of Safe Construction and Safety Equipment

A late great Pacific Coast naval architect once made the sage observation: "It is easy to design a perfectly safe non sinkable ship. But such a design will usually be tied to the drawing board by a non floatable overhead." Since we know this to be true, we are rather skeptical of the value to the American shipping industry of such legislation as S. 1916, the proposed Senate measure introduced by Senator Copeland with the purpose "to insure that all merchant vessels documented under the laws of the United States are so designed, constructed, equipped, maintained, operated, and inspected as to insure the maximum of safety to life and property."

To accomplish this purpose the act would: completely reorganize the Bureau of Marine Inspection and Navigation; specify rules for structural strength, water tight integrity, load lines, stability, and openings in bulkhead and shell plating; designate specifically the nature and extent of drills to train the crew; prescribe the tests for all parts of hull and machinery; define and require fireproof construction and fire detection, alarm, and extinguishing equipment; set forth the requirements for the design, construction, installation, and inspection of all machinery, both main and auxiliary, and including boilers and piping and all equipment appertaining thereto; and specifies all life saving and navigating equipment.

It will be seen that the scope of this bill is extremely broad. It is more or less based on the report of a technical committee appointed by the Senate and headed by Rear Admiral George H. Rock, past president of the Society of Naval Architects and Marine Engineers, and president of the Webb Institute of Naval Architecture. Others on this committee were: H. Gerrish Smith, president, National Council of American Shipbuilders; William Francis Gibbs, naval architect; George G. Sharp, naval architect; and a number of naval experts. This committee, after a thorough investigation of the Morro Castle and other marine disasters, brought out a very exhaustive report covering several hundred pages in fine print.

This report is a very good, thorough job, excellently edited and extremely well indexed. In a number of items it goes way beyond the requirements of the International Convention for Safety of Life at Sea. There can be no doubt that strict compliance with the suggestions of this report would make American ships the safest ships afloat. There can be no doubt, on the other hand, that this course would make American ships the most expensive to build and to operate and in some ways the least attractive to travel on.

One principal objection to this report and to the statute more or less founded thereon is the fact that the American ship operator was not represented on the committee. Couple this with the fact that, at the hearings held in connection with this bill, shipowners were told by the chairman that senators were not interested in the costs accruing to the merchant marine, all they were interested in was Safety. Can anyone imagine these same senators getting out a law telling the automobile builders of America how to design, construct, equip, and inspect the American automobile for safety? Yet the American automobile killed over 35,000 times as many American citizens last year as were lost on all the ships of the American merchant marine, coastwise, overseas, Great Lakes, and inland.

This technical report of the Senate appointed committee is an ideal to shoot at and to approve of, amend, or discard piecemeal, as experience indicates. To freeze its suggestions into a Federal statute is not only unwise but will, if accomplished, prevent much progress in the future.

Take an instance. The report followed by the bill recommends that the distance of 131 feet minimum between fireproof complete bulkheads in passenger quarters set by the International Convention be reduced to 66 feet. In large vessels this puts a very drastic limitation on the size of the public room spaces and sadly handicaps the American passenger agent in his sales arguments in competition with foreign passenger lines.

American passenger ships are now so statistically safe that talk of danger to passengers traveling on our merchant marine is almost ludicrous. The reports of the U. S. Department of Commerce for 1936 show that out of a little under 240 million passengers carried on American ships that year 141 died, but not a single one of these deaths was due to casualty to the ship or her equipment. Every fatality to a passenger was due to illness or suicide, or to some carelessness on the part of the victim that had nothing to do with the ship or the perils of the sea. That is a remarkable record, and one of which the American industry is justly proud.

The American shipowner is not overconfident on that record. None knows better than he the hazards of the business. But at the same time experience has taught him that personnel, and not equipment or construction, is the principal element of safety in any emergency at sea.

If the Federal Government insists on expensive standards for equipment and construction for ships, and at the same time weakens before union labor pressure in upholding its standards for seagoing personnel, the result will not be safety at sea but simply confusion in maritime finances.

If such a course continues, our ultra-safe ship designs will stay on the drawing board and be very safe indeed.

Pacific Marine Insurance Notes

A Unique Loss. It is an old custom to place books or other items of historical value in steel lined boxes and bury them in the foundations of an important building; but few people know that there is a 7-ton gas locomotive preserved in the structure of the Golden Gate Bridge.

When concrete for the piers was being poured, a 7-ton gas locomotive was at work hauling three cars of concrete. The track was wet and on the down grade the brakes failed to hold, and locomotive and cars slid over the end of the track into the hollow northern abutment—a drop of 100 feet.

The engineer did his best to stop the machine, and stayed with it as long as he could. But when they arrived at the end of the deck he peeped over and saw that it was a long way down, and anyway he had no desire to get into that soft cement at any elevation, so he leaped.

As a 7-ton locomotive could not be retrieved from a hollow abutment, it stands there to this day, and will remain as long as the bridge stands—Fireman's Fund contribution to the stability and strength of the Golden Gate Bridge—for of course the locomotive was insured with Fireman's Fund Insurance Company through its Marine Department, and the loss was paid in full.

Two Pioneers Unite. Two of the oldest insurance organizations on the Pacific Coast have joined hands, it became known yesterday, when the Home Fire and Marine Insurance Company announced the appointment of Balfour, Guthrie & Co., Limited, as general agents of the marine and inland marine departments for the state of California, effective as of May 1, 1937. It is a coincidence that the Home Fire and Marine Insurance Company was founded as the Home Mutual in 1864, the same year that Balfour, Guthrie & Co., Limited, established a marine insurance department.

One of the best known marine offices in the West, the marine department of Balfour, Guthrie is under the joint management of Harold V. Manor and Herriot Small, the latter a son of a former manager, A. H. Small, who served from 1889 to 1910. It is also interesting to note that Mr. Manor first started his insurance career as an employee of the Home Fire and Marine Insurance Company. The marine department of Balfour, Guthrie & Co., Limited, writing all lines of marine and inland marine insurance, maintains a Los Angeles office under the management of Gerald E. Hampshire.

The Home Fire and Marine Insurance Company is the oldest running mate of the Fireman's Fund Insurance Company. Organized in San Francisco as the Home Mutual in 1864, its name was changed to Home Fire and Marine when it was taken over by Fireman's Fund Insurance Company in 1892.

Longshoremen Injury Record. Injury reports to the United States Compensation Commission for February, 1937, show a total of 1360 non-fatal and 13 fatal injuries to American longshoremen during that month.

Of the non-fatal injuries, 871 resulted in lost time and 483 in no loss of time; 498 resulted from handling of objects; 207 from falling objects; 163 from falls of persons; 195 from moving objects; 63 from striking against objects; 40 from flying objects; and 39 from stepping in or on objects.

It is rather notable that the hazards that would commonly be connected with stevedoring operations account for so few injuries. Thus, vehicles account for 21; dusts, gases and chemicals for 18; hot substances for 2; machinery for 8; and explosives for 1.

Of the 13 fatal injuries, four are from falls of persons; 3 from falling, and 3 from moving objects; and 3 from miscellaneous. The same report lists 1284 non-fatal and 3 fatal injuries to marine repairmen during tions are quite different.

Of the non-fatal injuries, 980 lost no time and 304 resulted in time lost, while 354 were due to flying objects; 151 were caused by handling objects; 115 by conflagration and flames; 108 by falls of persons; 100 by hand tools; 87 by striking against objects; and 56 by hot substances. Two of the three fatal injuries to marine repairmen were due to falls of persons.

Of the above totals, the San Francisco district had 122 non-fatal and 1 fatal injury to longshoremen, and

24 non-fatal injuries to marine repairmen; the Seattle district had 118 non-fatal and 2 fatal injuries to longshoremen, and 26 non-fatal injuries to marine repairmen.

New Fire Alarm Actuator. The great publicity attending the Morro Castle fire horror investigations has started many inventive brains working on new safety devices. Among the most interesting and most promising of these is the Edison Fire Alarm Actuator, developed in the Edison Laboratories at East Orange, N.J., and recently given full approval after weeks of severe tests by the Underwriters Laboratories.

The device itself is a tiny glass tube about half the size of an ordinary fountain pen, enclosing a small bi-metal finger which can be adjusted to make an electrical contact at almost any temperature exposure in the danger range. The electrical contact through relays can be used for any desired purpose or purposes. It can set off alarms, and/or turn on sprinklers, and/or turn on lights, and/or start mechanism for closing fire doors, or any other mechanism that is necessary or desirable.

One of the very interesting possibilities in connection with automatic sprinkler or $C.O._2$ systems is the sensitiveness of this Actuator, which would enable it to sound the alarm before the sprinkler heads were opened by the heat of the fire and thus make it possible to save considerable property from water damage.

Fireman's Fund Record came out in a new style with its May issue.

The size and outside cover remain unchanged, but modern streamline effects are obtained on the inside pages by elimination of portrait cuts, by the use of bold face type in the headings in place of the former italics, and a newer treatment of lining up the columns and article titles.

Fireman's Fund Record, oldest house organ in the fire insurance business, was first published in 1880. It recently received honorable mention in a national house organ contest sponsored by Postage and the Mailbag.

All in all, the Record for May is a great improvement on past issues.

Every Three Seconds

Every three seconds an accident occurs! Someone is killed, maimed, or injured. The worst of this tremendous national loss of life, health, and happiness is that it is largely preventable.

A hundred years ago the people in this country found their protection largely a matter of their own devices and manner of living. They were subjected to the inevitable results of tornado, flood, and earthquake; but outside of general hazards there was not much else, and for the most part they could neither control the major catastrophies nor prevent the minor injuries. This was the era of "inevitable accidents" because so little could be done about them.

Today we face an entirely different situation, for in our complex industrial, commercial, and even domestic life is found a long list of what we call preventable accidents. These are not "Acts of God," but the results of carelessness and neglect. They fall naturally into the group that should never have happened.

With the beginning of industrial expansion accidents of every variety occurred and increased. A man was expected to assume the risks of running a machine in spite of the dangers involved. Thus the idea of the inevitable accident was carried over into the industrial age and at first the public accepted the injuries as the price to be paid for the advances of civilization.

Toward the close of the last century a new era began with industrial leaders advocating the theory that "safety must be the first consideration." Gradually attention was given to safety devices of every description and this in turn prepared the way for the development of the widespread interest in accident prevention that is nationally accepted today.

Nevertheless, every 3 seconds someone is killed, maimed or injured. In that short interval of time the whole course of someone else's life is changed. Health, comfort, and happiness are quickly transformed into suffering, poverty, and sorrow. Able men become hopeless cripples and the dark shadow settles down over what was formerly a happy home. In those fateful seconds the best things of life are taken away. Sometimes not even a memory is left and often the scars never heal.

(Ship's Bulletin, Marine Department, Standard Oil of New Jersey.)

Two Interesting Dredges for River Service

Two giant dredges, which are among the largest cutter head suction dredges ever built for the improvement of the national inland waterways system, are nearing completion at the shipyard of Dravo Corporation, Neville Island, Ohio River, below Pittsburgh, Pennsylvania. These dredges will be added to the facilities of the Corps of Engineers, War Department, for river improvement and flood control work.

The dredges are identical in construction. The overall length of hull is 230 feet; width, 48 feet; and depth of hull, 8½ feet. The hulls are of wrought iron. The house on the main deck contains the operating machinery. The second deck is fitted with quarters, including galley, for a crew of 64 men.

The dredges are of the type known as 20 inch cutter head, pipeline self-propelled. They are equipped with high pressure dredging pumps and will be able to pump dredged material through 3,000 feet of pipeline with a 25 foot lift. Under average dredging conditions, each dredge will pump from 1500 to 2000 cubic yards of material per hour. They are propelled by means of twin screws, and the stern is of the tunnel type.

One 1,000 horsepower diesel engine powers the pump and two 500 horsepower motors serve to drive the propellers. Two diesel generating sets furnish power for the propulsion motors, for electric lights, and for the various motor driven auxiliary equipment on each dredge. Each of the two diesel generator sets consists of a 650 horsepower diesel engine directly connected to two direct current generators, one of 400 K.W. capacity at 400 volts and one of 200 K.W. capacity at 240 volts.

Engineers' Licenses for May, 1937

Name and Grade	Class	Condition
HONOLULU		
Goo Sung, Third Asst. Eng.	OSS, 3500 GT	O
ALASKA		
John Liberg, Third Mate	OSS&MS, 5000 GT	O
Arthur F. Finigan, 2nd Asst. Eng.	OSS & MS, any GT	O
PORTLAND		
James Evans, Chief Mate	OSS, any GT	RG
Boone L. Wilson, Second Asst. Eng.	OSS, any GT	RG
Paul F. O'Brien, Third Asst. Eng.	OSS, any GT	O
SAN PEDRO		
Julius A. Kressin, Second Mate	OSS, any GT	RG
Walter H. Lee, Third Mate	OSS, any GT	O
Raymond W. Frobe, 3rd Asst. Eng.	OSS, any GT	O
Charles T. Morse, First Asst. Eng.	OSS, any GT	RG
William L. Scott, Chief Eng.	OMS, 1000 GT	O
Donald E. Selby, Chief Eng.	OMS, 1000 GT	O
Anson C. Spainhower, Chief Eng.	OMS, 750 GT	RG
Amos R. Watten, Chief Eng.	OMS, 750 GT	O
Paul S. Inlow, 2nd Asst. Eng.	OMS, any GT	O
SEATTLE		
Gunnar Olsborg, Master & Pilot	OSS, any GT	RG
Elwood K. Mott, Chief Mate	OSS, any GT	RG
Stanley E. Ridley, Second Mate	OSS, any GT	RG
Jack L. Hall, Third Mate	OSS, any GT	O
Aval A. Carlson, Third Asst. Eng.	OSS, any GT	O
Robt. C. Christopher, 3rd Asst. Eng.	OSS, any GT	O
Rex Clark, Chief Eng.	OMS, any GT	O
Charles G. Wood, Chief Eng.	OMS, any GT	O
SAN FRANCISCO		
Nils A. Nilsen, Master	OSS, any GT	RG
Edward Crabtree, Chief Mate	OSS, any GT	RG
Bennett M. Dodson, Chief Mate	OSS, any GT	RG
Alfred C. Aitken, Jr., Chief Mate	OSS, any GT	RG
Johannes Pedersen, Second Mate	OSS, any GT	RG
Allen Cameron, Second Mate	OSS, any GT	RG
William B. Slater, Second Mate	OSS, any GT	O
Raymond C. Russell, Second Mate	OSS, any GT	RG
Morris S. Chamberlain, Chief Eng.	OSS, any GT	RG
Charles A. Pohl, Chief Eng.	OSS, any GT	RG
Ray L. Sullivan, Chief Eng.	OSS, any GT	O
Thomas Malley, First Asst. Eng.	OSS, any GT	RG
Clyde A. Rose, First Asst. Eng.	OSS, any GT	RG
Geo. Joseph Ruf, Jr., First Asst. Eng.	OSS, any GT	RG
Cyril G. Hansen, Second Asst. Eng.	OSS, any GT	RG
Matthew W. Kennedy, 2nd Asst. Eng.	OSS, any GT	RG
Michael J. Garber, Second Asst. Eng.	OSS, any GT	RG
John R. Young, Second Asst. Eng.	OSS, any GT	RG
Olaf Nesbak, Second Asst. Eng.	OSS, any GT	O
Johann C. Obergfell, 2nd Asst. Eng.	OSS, any GT	O
Everett E. Dufford, Third Asst. Eng.	OSS, any GT	O
Charles E. Smyly, Third Asst. Eng.	OSS, any GT	O
Charles O. Sairanen, Third Asst. Eng.	OSS, any GT	O
Dale C. Wigle, Chief Eng.	OMS, any GT	RG
Philip M. Vella, Chief Eng.	OMS, any GT	O
Ray L. Sullivan, Chief Eng.	OMS, any GT	O
Francis C. Strain, 2nd Asst. Eng.	OMS, any GT	O

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Emergency Loudspeaker Systems

(Continued from Page 43)

has an indicator lamp on the power amplifier rack that shows the condition of the line, indicating open or short circuits. These lamps are operated from a small motor generator set that may be operated continuously or at will for intermittent inspection. The voice frequency currents do not pass through the lamp filament.

(2) **Amplifiers Interchangeable:** The individual power amplifiers are assembled on interchangeable unit panels. As many of these unit panels as are needed are mounted in the main amplifier rack. They are exact duplicates and are instantly interchangeable. In case of trouble with any unit it can be instantly removed from the rack and a spare unit quickly put in its place. Connections to the panel units are made with waterproof butt contact plugs and receptacles so that no permanent connections are disturbed in making these changes.

It will be evident from the foregoing that the Remler Marine Emergency Loudspeaker System is not an assembly job, but is designed and manufactured in all of its details and in its assembly to be especially adaptable and useful to meet various conditions aboard seagoing ships. It is absolutely dependable under emergency conditions; it is easily accessible for repairs and replacements and maintainance costs are extremely low.

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

Progress of Shipbuilding in American Yards in 1936

The progress of shipbuilding during 1936 in those private shipyards of the United States which normally construct seagoing vessels is indicated by the following table:

	Merchant Vessels		Government Vessels	
	Number	Gross Tons	Number	Tons
Under Construction January 1, 1936	16	92,074	46	182,024
New Contracts Placed During the Year	25	166,240	9	13,350
Vessels Delivered During the Year	11	66,624	16	34,584
Under Construction December 31, 1936	30	191,690	39	160,790

As shown in the above table, there were 16 merchant vessels under way at the beginning of 1936, consisting of eleven tankers and five ferryboats. At the beginning of 1935 only two oil tankers above 1,000 tons were under construction.

Of the thirty contracts on hand December 31, 1936, contracts for ten vessels of 76,200 gross tons were placed during the period July to October, and contracts for eleven vessels of 53,700 gross tons were placed in November and December.

Contracts were placed during the year for the construction in private shipyards of nine naval vessels, consisting of six 1,500 ton destroyers and three 1,450 ton submarines.

Nine seagoing merchant vessels and two ferryboats were delivered during the year. The tankers were for the Gulf Refining Company, Pan American Petroleum and Transportation Company, Standard Oil Company of New Jersey, and the National Petroleum & Transportation Company; and the two ferryboats were for the Erie Railroad Company and the Virginia Ferry Company.

One heavy cruiser, two submarines, seven 1,850-ton destroyers, and six 1,500-ton destroyers were delivered to the Navy Department during the year by the private shipbuilding industry.

The approximate value of unfinished business on new seagoing construction in the private seaboard yards decreased from $179,000,000 at the beginning of the year to $165,000,000 at the close of the year. Eighty per cent in value of work on hand represents naval construction.

(Annual Report, National Council of American Shipbuilders.)

A splendid report. The only critical comment as far as Pacific Coast readers are concerned is that none of the seagoing tonnage is building on the Pacific Coast.

M.S. Feltre Repairs

The motorship Feltre, which was sunk in the Columbia River after collision with a Luckenbach cargo liner, will, if repaired, furnish the largest repair contract of the month to the successful bidder. Albina Iron Works of Portland has proffered a bid of $328,167 and 110 days, the next lowest bidder being Todd Drydock of Seattle, at $348,000 and 56 days. The Feltre had over 200 feet of her side plating torn off and suffered much other structural damage.

Vessels to be Scrapped

On May 1 the Maritime Commission issued invitations for bids for the purchase (solely for scrapping) of 28 of the steel ships in its laid up fleet. These ships, ranging in size from 1,500 to 10,000 deadweight tonnage capacity, are located: Four at Staten Island, New York; seventeen at Norfolk, Virginia; and seven at New Orleans, Louisiana.

Diesel Barge Contract Awarded

A contract at an undisclosed price for the construction of an all-welded twin screw 1000 brake horsepower diesel-electric propelled barge has been awarded by the Standard Oil Company of New Jersey, New York, to the Newport News Shipbuilding & Dry Dock Company, Newport News, Virginia. The new barge will be 250 feet by 43 feet by 18 feet.

(Please turn to page 54)

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: Hull 5355—McCall (DD400). Completion date March 1, 1938. Hull 5356—Maury (DD401); completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341′ 3⅝″; beam, 35′ 6⅛″; depth, 19′ 8″. Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; completion date July 24, 1937.

DRYDOCK AND ROUTINE REPAIRS: M. S. Adelian, Manulani, Dungannon, Kewanee, Stm. Sch. Wapama, Hegira, Tug F. A. Douty, Corrales, Cuzco, Antigua, Gen. Frank M. Coxe, M.S.W.B. Walker, W. S. Rheem, Maui, Maloto, Pres. Lincoln, Charcas, Manukai, Makawao, Mount Baker, Pres. Pierce, U.S.S. Utah, Lumbertown, Chiriqui, Paulsboro, M.S. Californian, West Shipper, Richmond, W. S. Miller, Admiral Wood, U.S.S. Shosone, Stm. Sch. San Diego, Massmar, M.S. South Africa, Pres. Wilson, Capt. A. F. Lucas, Talamanca, U. S. C. G. Bonham, U. S. C. G. Nemaha, D. G. Scofield, Shell Oil Co. Barge No. 1, Alvarado, District of Columbia, Sacramento, Argyll, Santa Elena, K. R. Kingsbury, Los Angeles, U. S. Dredge A. Mackenzie.

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION: 2 keels laid July 6, 1936, Fellows Craft stock cruisers 30′ x 8′ x 2′6″, powered with Kermath Sea Flyer 6-cylinder 85-H.P. engines with 2 to 1 reduction gears. Delivery date, June, 1937.

Five 32 ft. W.L., 46 ft. O.L. One design sloop yachts; auxiliary power, with small h. p.

One 40′ sport fishing boat, twin screw, Kermath gas engines. Estimated delivery date August 1, 1937.

DRYDOCK AND ROUTINE REPAIRS: Yachts K'Thanga, Joyita, Alrene, Zoe H., Ortona, Tamalmar; Tuna Clippers Liberty Bell, City of Naples, Oakland; 54 small boats.

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Miscellaneous repairs and drydockings.

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: Four 80′ U. S. Coast Guard patrol boats; 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; estimated launching, 2 in June, 2 in July; expected completion, August, 1937.

Two 78′x20′x9′6″ Lamparo fishing boats; one for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; second for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. Delivery date September, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: North Wind.

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: W. M. Tupper, C. & G. Survey Boat Explorer, Lighthouse Tender Hemlock.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: Point Loma, Sunset Pacific Oil Barge, M. V. Capella, Associated Barge No. 6, Eagle, M. V. Velma, F. B. Vagabond, F. S. Loop, Tug Jimmie K., Topila, Barge Samson, G. B. Phoenix, Barge Homer, Yacht Volador, Yacht Maria Delores, Richfield Barge No. 2, M. V. Lelv Eiriksson, Avalon, Richfield Barge No. 4, R. J. Hanna, General Petroleum Barge No. 6, Neptunian, Golden Mountain, Golden Star.

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Davenport, El Segundo, Annie Johnson, J. A. Moffett, Water Barge YW 30, Frances, Patterson, Wm. H. Smith, Glacier, Olinda, Golden State, Maunawili, Elizabeth, Tahoe, Oregonian, Associates, J. C. Fitzsimmons, Golden Cross, Chetopa, K. R. Kingsbury, Delaref, Edna Christenson, Bering, Knute Nelson, Iowan, D. G. Scofield, H. T. Harper, Panaman, Pennsylvanian, Billie Louise, Nereta-K, Star of Monterey, Lake Miraflores, Barge Maltha, Anadir, Standard Barge 93, Esther Johnson, Cutter Itasca, Brunswick, Californian, Samoa, Tahoe, Madrona, Eleanora Maersk.

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: 6 scows; 7 fish boats; 40 ship repair jobs not requiring docking; 43 commercial jobs.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: U.S.S. Patterson (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; estimated completion date, September 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date, October 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: Cushing, Perkins, Tennessee, Oklahoma, Arizona, Louisville, Eagle 57, Wando, Samuel D. Ingham.

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Keel laying begun for ten 36′ and ten 29′ stock keels.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: Tug Tyee, Charcas, Julia Luckenbach, Hamlin F. McCormick, Katrina Luckenbach, General W. C. Gorgas, M.S. Donna Lane, Forbes Hauptman, Point Estero, Dellwood, Standard Service, Tug Richard Holyoke.

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley,** Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); keel laid January 14, 1936; launching date, March 11, 1937; estimated delivery, October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery, July, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: **Elliot, Dorsey, Dahlgren, Overton, Lamberton, Boggs, Chicago, Ramapo, Koka, Grebe, Henderson, Pinola, Vestal, Bridge, Wm. J. Duane, Narwhal, Cachalot, Cuttlefish.**

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION: **Hull No. 125, Western Sun,** purse seiner; 72' x 18'; powered by Atlas 135 H. P. engine. Keel laid March 10, 1937; launched May 8, 1937; delivery date June 1, 1937. Owner, John Bocaka, Everett, Wash.

Hull No. 126, purse seiner; 76' x 20'; powered by Washington 200 H. P. engine. Keel laid May 1, 1937. Owner Peter San Felippi, Monterey.

Hull No. 127, purse seiner, 82' x 20'; 200 H.P. Atlas engine. Owners, Ed. & J. Kaseroff and E. Manaka, of San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Fishing Boats Western Chief, St. Anthoney, Helen L., Sitka, Paddy, Craig, Georgia, Gladiator, Stanford; Pile Driver Hiyu,** for Hart Construction Co.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION: 3 dump scows 114'x26'x7'9".

Six barges, 196' x 34' x 8', for Barrett Line, Inc., Cincinnati, Ohio.

One oil barge, 145' x 26' x 7' 4" for Standard Oil Co. of Ohio.

DRYDOCK AND ROUTINE REPAIRS: 20 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: Two bulk lake freighters 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis** and **DD396 Jouett;** Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396,** keel laid, Mar. 26, 1936. **DD395,** keel laid July 28, 1936. **DD394,** keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and **DD410, Hughes,** two **1500-ton** destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 174, Tide, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, June 1, 1937.

Hull No. 175, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass. owners; estimated delivery, July 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; launched February 25, 1937; estimated delivery, June, 1937.

CV7, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; estimated delivery February 1, 1938.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil** tankers—steam—425'x64'x34' for Gulf Refining Co.; total tonnage 7070 each.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel towboats** of 550 H. P. each, for private parties. Delivery dates June 1, 1937, and July 1, 1937.

One 90' all-welded diesel tug for the Barrett Co.; 97'x25'x10'; estimated delivery date June 1937.

DRYDOCK AND ROUTINE REPAIRS: Overhauling fleet of tugs and barges for W. E. Hedger Transportation Co.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Two trawlers** for the Portland Trawling Company; 146'6'x25'x14'2".

DRYDOCK AND ROUTINE REPAIRS: **Yachts Osprey, Mercury IV, Venturer, Panther; Tugs General Jackson and Hinton.**

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

One 73' cruiser, 2 Speedways; delivery date, June 1, 1937.

One 65' cruiser, 2 Speedways.

One 42' play boat, 2 Kermaths; delivery date, June 1, 1937.

One 39' play boat, 2 Buda diesels.

One 39' play boat, 2 Chryslers.

Three 39' play boats for stock.

One 42' play boat for stock.

One 56' cruiser, 2 Lathrops; delivery date, August 1, 1937.

One 57' cruiser; delivery date September 15, 1937.

One 26' runabout; delivery date July 1, 1937.

One 50' cruiser, 2 MC Speedways; delivery date August 1, 1937.

One 42' play boat, 2 Chrysler Royals; delivery date August 1, 1937.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One lighthouse tender, Elm, 72' 4" x 17' 0" x 6' 6", for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

One diesel yacht, powered by 1,000 h.p. Winton engines; 143' long, 23' beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997,** one diesel sternwheel towboat of 91 gross tons.

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100'x26' x6'6"; 320 gross tons.

Hulls Nos. 1372-1374, inclusive; three welded flush deck cargo box barges 130' x 34' x 10', for Warner Equipment Co., Philadelphia, Penn.; 1356 gross tons.

Hulls Nos. 1375-1378, inclusive, and **1384,** five welded steel deck barges 80' x 30' x 9', for Pennsylvania Railroad, Phildelphia, Penn.; 885 gross tons.

Hull No. 1383; one type W-3 welded coal barge 175'x26'x10'8", for stock; 472 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hull 1387; one riveted steel coal barge 170' 3" x 40' 2" x 17', for Oliver Transportation Co., Philadelphia, Pa.; 1100 gross tons.

Hulls Nos. 1392-1396 and 1398-1412, inclusive; twenty welded steel coal barges 140' x 26' x 10', for Wheeling Steel Corp., Wheeling, West Va.; 7100 gross tons.

Hulls Nos. 1413-1414; two welded

steel towboat hulls for National Shipping Company; 600 gross tons.

Hulls Nos. 1415-1424, inclusive; ten welded type W-3 coal barges 175' x 26' x 10' 8"; for stock; 4720 gross tons.

This makes a total of 47 hulls with a total gross tonnage of 16,974 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15 1936; launching date June, 1937.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936; launching date July, 1937.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October, 1937.

Hull No. 29, Sargo (SS188); estimated keel laying date, May, 1937.

Hull No. 30, Saury (SS189); estimated keel laying date July, 1937.

Hull No. 31, Spearfish (SS190); estimated keel laying date, September, 1937.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; keels laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, DD397 Benham, DD398 Ellet and DD399 Lang, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing; keel laid, Hull 143, Decemer 16, 1936; Hull 144, February 8, 1937.

Two destroyers, DD411 and DD412.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8'. Probable launching date September 21; delivery date, approximately Oct. 15.

One gold dredge, 120' x 65' x 9' 9"; duplicate of Dredge No. 4; 800 tons capacity. For South American Gold & Platinum Company, New York, N.Y. Delivery to be knocked down for export.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all-welded steel diesel tugboat; 64' 11" long, beam molded 18', depth molded 7' 9"; equipped with 380 H.P. Atlas Imperial engine; for Pan American Refining Corp., New York City. Delivery date, July, 1937.

One all-welded steel diesel tugboat; 74' long, beam 19', depth 9'; equipped with 380 H.P. Atlas Imperial engine; for Higman Towing Co., Orange, Texas. Delivery date July, 1937.

One twin screw diesel electric all-welded steel automobile and passenger ferryboat; length overall 149', beam over guards 66', depth molded 11'; equipped with two 6 cyl., 350 H.P. Cooper Bessemer engines. Delivery date, June, 1937.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: One single screw, electrically welded, steel oil tank steamer, 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated launching date, July 15, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION:

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. Keel laid December 9, 1936; launched May 3, 1937; delivery date, June, 1937.

Four steel landing barges for the Wheeling Steel Corp., of Wheeling, W. Va.; 90' x 18' x 5'; two equipped with electric winches; two with hand capstans; launched May, 1937.

One steel derrick boat hull, 66' x 40' x 5' 9"; for stock; launched May, 1937.

Ten steel coal barges, 175' x 26' x 11'; for stock; launching dates June and July, 1937.

Three all welded steel oil barges 175' x 35' x 8' 6", for Standard Oil Co. of New Jersey; to be used for service on Ohio and Mississippi Rivers; delivery date August, 1937.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: Three steel carfloats, 250' x 34' x 9'; for the Pennsylvania Railroad; delivery dates, one June 8, 1937; two July 10, 1927.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers: Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: H 359 aircraft carrier CV5, Yorktown, for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6".

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launching date, August 1, 1937; delivery date, September, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

DRYDOCK AND ROUTINE REPAIRS: Barge Roddand, Tug Hilton, Yacht Ohbee II, Tug Hamilton, Tug G & E No. 1, Tug Baldrock, Rob't E. Lee, Pilot Boat Wm. D. Sauver, Lighter No. 17.

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, August, 1937; delivery date, September, 1937. No. 162, launching date, February, 1938; delivery date, February, 1938.

Hulls No. 163, 164, and 165, three diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launching date, July, 1937; delivery date August, 1937. No. 164, keel laid December 15, 1936; launching date, January, 1938; delivery date, February, 1938. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-

Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; delivery date, September, 1938.

TAMPA SHIPBUILDING & ENGINEERING CO.
P. O. Box 1838
Tampa, Fla.

DRYDOCK AND ROUTINE REPAIRS: Cuba, Railroad Car Ferry Joseph R. Parrott, Yacht Alva, U. S. Hopper Dredge Absecon.

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION:

1 derrick barge 100' x 44' x 6' for U. S. Engineer Office, Vicksburg, Miss.; delivery date, July, 1937.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, July 23, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching, May 7, June 4, and July 2, 1937, respectively; estimated delivery, August 3, August 24, and September 14, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 14, May 11, and June 8, 1937, respectively; estimated launching, August 17, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6". Keel laying date, June 8, 1937; launching date, July 20, 1937; estimated delivery, July 26, 1937.

CRANE PLANT
27th Street, Brooklyn, N.Y.

Hull No. 849, ferryboat John J. Walsh, for the Westchester Ferry Corp., Yonkers, N.Y. LOA 153', beam, extreme, 48', depth 14' 6". Estimated keel laying, April 27, 1937; estimated launching, June 22, 1937; estimated delivery, July 27, 1937.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19'8"; estimated delivery indefinite.

Order placed for **DD415, O'Brien,** and **DD416, Walke,** two destroyers; delivery dates, August, 1939, and October, 1939, respectively.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn,** light cruiser. L.B. P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu,** light cruiser; L.B. P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935. Estimated launching indefinite; estimated delivery, May 1, 1938.

CL 50, **Helena,** light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

DRYDOCK AND ROUTINE REPAIRS: Cummings arrived March 29 for docking, preparation for final trials, and completion of work. Estimated completion, June 4.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for **one harbor tug;** LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'.

UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404,** 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

SS192, Squalus, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

New Steel Tuna Clipper

Lake Washington Shipyards, at Houghton, Washington, are building a 120 foot steel hull tuna clipper for Southern California interests. This vessel will be propelled by a 600 shaft horsepower Enterprise diesel engine, and will be equipped with the most modern refrigerating machinery for maintaining a correct temperature in the fish holds. The principal item of interest in the contract is the fact that steel will be used instead of timber for the hull. She will be delivered in September of this year. If this vessel proves to be the success which her owners and builders anticipate, she will set a fashion for a long line of tuna clippers.

A Knockdown Gold Dredge

The Ingalls Iron Works Company, of Birmingham, Alabama, have recently received a contract to build a gold dredge with a hull 120 feet long, 65 feet beam, and 9 feet 9 inches depth. This dredge will have a capacity for 800 tons. It will be equipped with the latest machinery for handling gravel and silt. Assembled and tested at the works, it will then be knocked down for export to South America for the South American Gold and Platinum Company.

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Shell Official Advanced

I. N. Titland has been appointed to an important post in the Shell Oil Company's merchandising system.

Formerly Sales Manager of the Oakland division, Mr. Titland has been brought into the Home Office at San Francisco as Lubricating Oil Department Head. This elevation is part of a far-reaching re-alignment of Shell sales executives in which eleven of the company's key marketing men have been assigned new positions of responsibility.

Mr. Titland has had long and varied experience in the steamship business. His "sea-going" connections include service with Alaska Steamship Company, Garland Steamship Company, and the U. S. Shipping Board. He joined up with Shell as a salesman in Tacoma back in 1919 and over a series of promotions has held lubricating sales positions in Portland, Los Angeles, San Francisco, and more recently in Oakland.

Mr. Titland brings to his executive post a fine background of specialized experience and training and his countless friends in Coast transportation circles will wish him well.

I. N. Titland

Capt. Trout New P.P.L. Superintendent

Kenneth D. Dawson, on the day he assumed his new position as vice-president and Pacific Coast manager of the Panama Pacific Line and other International Mercantile Marine interests at San Francisco, announced the appointment of **Captain Vance Trout,** port captain of the States Steamship Company for six years, to the position of superintendent of operations for the Panama Pacific Line.

Captain Trout was one of the mainstays of Dawson's States Steamship Company and Atlantic-Pacific Steamship Company organizations at Portland, and his advancement to the San Francisco position was applauded by his Portland friends.

When he won his master's papers in 1923 and took command of the war-time steamer Bearport, he was only 26 years old, one of the youngest Americans holding a command at sea. At the age of 39, still a young man, he takes one of the most important shore commands on the Pacific Coast.

Capt. Vance D. Trout

Victor Aids Golden Gate Bridge Dedication

Climax of Golden Gate Bridge Dedication Ceremonies was the cutting of the chain that removed the last water barrier to an all-wheel highway from the Canadian to the Mexican border. May 28, 1937, thus became an historic date in the unification of Pacific Coast interests. Arrangements for the cutting of the gold, silver and bronze links in the symbolic chain were perfected by officials of Victor Equipment Company of San Francisco, which provided many of the electric and gas welding devices and supplies used in the construction of the giant span.

Participating in the ceremonies, left to right: E. L. Mathy, first vice-president Victor Equipment Company; William P. Filmer, president Golden Gate Bridge and Highway District; Mayor Angelo J. Rossi of San Francisco; Frank P. Doyle, treasurer of Redwood Empire Association and a director of the Golden Gate district, one of the original proponents of the project; and E. A. Daniels, sales manager welding division Victor Equipment Company. The three torches, gold plated, were presented by the manufacturers to the officials who wielded them at the dedication.

Propeller Club of California Observes Maritime Day

Meeting jointly with the Foreign Trade Association, the Junior Chamber of Commerce and the San Francisco Commercial Club, members and guests of the Propeller Club of California observed National Maritime Day on Friday, May 21st, at a luncheon held in the main dining room of the Commercial Club. The large room was filled to overflowing by maritime men and others allied with merchant marine affairs.

President Edward Harms gave the introductory address. He spoke of our heritage of the sea, tracing the course of the merchant marine and its place in the nation's prosperity. Speaking of our former triumphant days in the world's commercial relations, President Harms gave an optimistic prophecy of the re-awakening of public interest which will bring a rejuvenated American merchant marine to safeguard our commerce and to protect our naval efficiency. Harms in turn introduced Charles L. Wheeler, executive vice-president of McCormick Steamship Company, who gave one of the two main addresses of the day.

"The United States needs a home-owned transportation system," stated Wheeler. "This is the fundamental fact which must be impressed on the public. Remember that Prosperity is assured when our foreign trade exceeds five billion dollars. The world trade in the 1920's was 80 billion. During the depression years the figure dropped to a low of 20 billion. Now we're back to 40 billion—the half-way mark.

"Our share of this world trade is now 4½ billion. Five billion means prosperity for manufacturer, farmer and citizen. We must keep our fields and factories busy!"

On the status of American shipbuilding Speaker Wheeler pointed out that present-day construction amounts to 150,000 tons, mostly tankers. The necessity for new tonnage is urgent. Our war-built fleet is now worn out.

Captain John A. Rumsey of Standard Oil Company of California, chairman of May meeting, Marine Section, National Safety Council.

Facing the problems of rehabilitation, maritime labor must be acquainted with its responsibility, observed the speaker. "A national policy is needed and there is every indication that a sound program will be laid out by the new Maritime Commission."

Charles Wheeler's address was particularly well planned not only for the marine-minded who comprised the audience in attendance, but for the general public who listened to the broadcast of the program over NBC.

Almon E. Roth, president of the Pacific American Shipowners Association, was next introduced. An abstract of his speech appears in this edition of Pacific Marine Review.

- **New Members**

  Captain William Fisher.
  Fred Doelker.
  Fred Adams.
  George Eggers.
  W. C. Quayle.

Marine Safety Dinner

Some eighty Pacific Coast marine safety men and their friends assembled at dinner in the Engineers Club, San Francisco, for a stated meeting of the Marine Section of the National Safety Council. In the absence of Albert O. Pegg, superintending engineer of the Marine Department of the Union Oil Company and chairman of the Pacific Coast Division of M. S. N. S. C., the meeting was called to order by Captain Henry Blackstone, who, after some good natured chaff on the alibis of absent chairmen and vice chairmen, turned proceedings over to Capt. G. A. Rumsey as chairman of the evening. Captain Rumsey introduced executive officer George Barclay, of the California State, who entertained the meeting at length with discourse and pictures of the California Nautical School and their recent cruise to the South Seas. This was followed by a very informative address from Carl Fry, chief engineer of the California Industrial Accident Commission, stressing the values of accident prevention work.

Xzit Locates S. F. Factory

Howell H. Ware, managing director of XZIT Pacific Company, is currently announcing to the marine and industrial trades the location of a factory site at 779 Bryant Street in San Francisco.

The new manufacturing set-up has been occasioned by the firm's growing business in the Bay area. XZIT, fire scale and soot eradicator, will now be available for quick delivery to steamship companies headquartered locally.

Production manager at the San Francisco plant is Joe Baschand, formerly in charge of the Los Angeles factory. Sales and service manager is M. A. ("Morry") Ledoux.

George E. Swett & Co., Engineers, at 58 Main Street, are the marine sales agency in the San Francisco Bay area. W. H. Rudy continues in charge of the XZIT Company's interests in Los Angeles.

● R. T. Strong Appointed

The Westinghouse Electric and Manufacturing Company announces the appointment of Ronald T. Strong as Pacific Coast Transportation Manager, with headquarters in San Francisco, to fill the position left vacant by the untimely death of Mr. Karl A. Simmon. Mr. Strong's appointment became effective April 20; however, he did not take over his duties in San Francisco until May 3.

After Mr. Strong's graduation from the University of California, he was employed by the Portland Railway Light and Power Company of Portland, Oregon, in the capacity of Transportation Engineer. This was followed by two years service with the United States Navy, at the termination of which he became a part of the Westinghouse Company. He has been Transportation Group Leader of the Seattle Office for a number of years, and has had considerable experience in steam railroad electrification, light traction, and marine work.

Mr. Strong is an active member of the United States Naval Reserve, with the rank of Lieut. Commander. He was in command of the First Battalion, Fleet Naval Reserve, in Seattle. He has contributed to the United States Naval Institute Proceedings, and his essay, "Pressures Against Peace" won second prize in their 1935 Prize Contest.

● E. V. Winter Removal

Eugene V. Winter Co., engineers, have moved their offices to 19 Main Street, San Francisco, where the same telephone number will be maintained—DOuglas 2714. Mr. Winter and his associates are prepared to give expert service to users of steam and diesel power plants.

● Wedding Bells

A complete surprise to many friends of Fred A. Hooper, district manager of American-Hawaiian Steamship Company in Los Angeles, came with the announcement of his marriage to Mrs. Lelia Bright. After the wedding the couple left for Del Monte, where they spent a short honeymoon before returning to Los Angeles, in which city they will make their residence.

Merchant Marine Officers Club Progresses

After nearly five months of organization, the Merchant Marine Officers' Club has been successfully launched.

Headquarters have been established at 23 California Street in San Francisco. The entire mezzanine floor of this building has been converted into a club-room which every licensed officer of the American Merchant Marine is very welcome to make his headquarters while in San Francisco. This location is only a short walk from the waterfront.

Comfortable lounge chairs, a selection of various marine magazines and other publications, a radio, card tables, and chairs and tables are all there for the convenience of the members and their guests. Excellent lunches are served every day right in the club-room at very low prices. Refreshments mixed by old-time experts are also served in the club-room.

The above photograph shows a cozy corner in the Club, where members are enjoying their leisure hours meeting their fellow officers and entertaining their friends.

"Mine host" in these relaxing surroundings is Club Manager Bill Don, who personally watches out for the comfort of members and their guests.

The officers of the club are inviting all licensed officers to join and make the M. M. O. C. their headquarters while in the port of San Francisco. Membership is now available for $12.00 per year, and applications may be had upon request directed to the Secretary, Merchant Marine Officers' Club, 23 California Street, in San Francisco.

FOUR WATERFRONT WINNERS!

Port to starb'd: George Lacy; John Pruner, Purchasing Agent of American-Hawaiian S. S. Company; Les Moody, American wire rope authority; and Irv. Reed, skipper of Pacific Coast Rubber Company. This fearless Embarcadero foursome won as many prizes when the P.A.'s convened at California Club, San Francisco. Irv Reed says Les and John and George are steadiness personified. The Propeller Club handicapping committee should watch this frolicsome quartet.

Pacific Marine Personalities

Closing of the San Diego office of the Panama Pacific Line brought about several changes, which were recently announced by **Hugh Middleton**, general freight agent.

W. K. Sempey, former manager in that city, was transferred to Los Angeles as assistant general freight agent; and **Guy Yates** was brought there in the capacity of claim agent with headquarters at the port, succeeding **J. E. Boggeln**, the latter becoming operating agent at the harbor.

Visitors to Los Angeles the early part of last month, who left San Francisco to represent the oil committee of the Pacific Westbound Conference, were **F. F. Allen**, assistant traffic manager of Oceanic & Oriental Navigation Company, and **A. L. Wise**, manager of Oriental services of General Steamship Corporation. The oil committee met with Los Angeles exporters of petroleum products in the club rooms of the Transportation Club. The meeting was presided over by **Clarence Yenney**, assistant district manager of General Steamship in Los Angeles and sub-chairman of the conference.

George Littlejohn's second child is causing quite a stir in the office of the Grace Line, where Littlejohn handles some of the problems having to do with claims, revenue figures, and so forth. Littlejohn arrived on May 8 with the glad tidings that he was again a father—this time of a 7½-pound son. Another prospective Grace Line executive!

A recent arrival in Los Angeles was **Masatomo Inouye**, the new United States manager for O.S.K. Line, on his way to New York for the assumption of his new duties. He had been stationed in the Shanghai office since 1933, previously being submanager in the New York office for a period of ten years.

Harold C. Smith, district manager of Williams, Dimond & Company, recently attended the annual meeting of the Trans-Pacific Passenger Conference at Del Monte. He represented the Osaka Shosen Kaisha Line, for which his company is agent.

Rear Admiral **H. I. Cone**, U.S.N., retired, was recently elected as chairman of the Board of Directors of Moore & McCormack Company, Inc., New York. The company operates the American Scantic Line, Inc., running to Northern Europe, as well as a fleet in the coastal and intercoastal trade. It is, incidentally, the oldest established American company in the South American trade, and is the United States agent for the shipping activities of the U.S.S.R. In his new post, the chairman will be particularly concerned with the expansion of these various interests.

Admiral Cone has had a career of great responsibility. In 1909 he was appointed chief of the Bureau of Engineering of the Navy Department at Washington, after which he was marine superintendent of the Panama Canal until the outbreak of the World War, in which he was very active. After retirement in 1922 because of wounds suffered while on a torpedoed ship, he became assistant to the president of the Panama Railroad Steamship Line in New York, later being appointed a member of the United States Shipping Board by President Coolidge. In 1935 he resigned from the post of chairman of the advisory committee to the Secretary of Commerce. Admiral Cone is the fourth United States Naval Academy graduate to join Moore & McCormack as an executive.

● Tubbs and the Golden Gate Bridge

Timed with the four-day dedication ceremonies of the world's largest suspension bridge a very novel mailing-piece was directed to the trade by Tubbs Cordage Company.

Planned as a souvenir, the message was devoted to the now famous life-saving net manufactured from Tubbs rope. Attached to the mailing card appeared a specimen representing the actual principle of construction with the newly devised LS Metal Rope Clamps. A photographic reduction of a small section of the net showing the 6 inch x 6 inch mesh was also displayed. A description of the net set forth facts and figures of its magnitude . . . an area of 121 feet by 6500 feet, requiring 3½ million feet of fire-proof rope.

THEY SAW THE BRIDGE

On the "fiesta cruise" of the S.S. Virginia on May 31, when 600 San Franciscans were guests of the Panama Pacific Line on a trip under the Golden Gate bridge and around San Francisco Bay. Photo shows from left to right: Leo. E. Archer, Passenger Traffic Manager of the line; Capt. Geo. V. Richardson, Commander of the liner; and Kenneth D. Dawson, recently appointed Vice-President of the International Mercantile Marine Co. in charge of Pacific Coast activities of the United States Lines, Panama Pacific Line and their associated services.

As assistant to Chairman Kennedy, **S. Duvall Schell**, for 18 years associated with government shipping agencies in various capacities, will remain with the Maritime Commission, it was announced recently. Schell was acting director of the Commission's Division of Transportation. He had sent in his resignation, but accepted the new appointment at the request of the chairman.

Announcement was recently made of the succession of **Alfred Johnson**, veteran San Pedro shipping figure, to the post of district manager of the C. J. Hendry Company, ship chandlers, after the resignation of **William Maggio**. He has been associated with the company since the World War, learning the shipping business as a boy in San Pedro. His old post of assistant manager in that area will be filled by **John Logan, Jr.**, also a native of San Pedro. Maggio is now en route to Italy.

Bilge Club News

J. J. Murray, marine superintendent at Los Angeles harbor for the Associated Oil Co., was elected chairman of the Bilge Club for the 1937-38 fiscal year. He succeeds Thomas B. Forster, Superintendent of the San Pedro works for the Bethlehem Shipbuilding Corp.

Murray's election occurred on the evening of May 4, when the Bilge Club held its annual business meeting and dinner at the California Yacht Club in Wilmington. Elected to serve on the board of directors with Murray were J. W. Malseed and Forster, past chairmen; Alfred W. Johnson, A. O. Pegg, George Sutherland and Arthur Woll.

The Bilge Club's annual golf tournament and barbecue will be held on the afternoon and evening of June 26 at the Palos Verdes Golf Club. W. H. Wickersham, veteran San Pedro custom house broker, has again been named general chairman of the event. He will be assisted by a large committee.

New Pilot

Owing to the recent resignation of **Milton Thwing,** veteran San Francisco bar pilot, because of ill-health, **Charles F. White** was appointed in his place. White was formerly first officer and skipper of the Yale until that ship was taken out of service some years ago, since which time he has been harbor master at Long Beach.

Vacation

Mr. and Mrs. Roger D. Lapham have made plans to leave on a deferred vacation embracing the Orient and South Seas. They plan to visit Japan, China, the Philippines, Java, Australia, and New Zealand, and to be gone till September. Mr. Lapham is president of the American-Hawaiian Steamship Company. The trip will be strictly for pleasure.

Necrology

J. B. Waterman, Chairman of the Board of the Waterman Steamship Corporation, operators of one of the largest fleets of steamships on the Gulf Coast, died in Mobile recently at the age of 72 years.

DECORATED FOR MARINE SAFETY WORK

Charles J. Pannill, President of the Radiomarine Corporation of America, a Fellow in the Institute of Radio Engineers and a member of the Society of Naval Architects and Marine Engineers, was awarded the medal of Chevalier de l'Ordre de Leopold by H. M. the King of the Belgians in an informal ceremony in the RCA Building on May 13. The decoration was presented by Henry Mali, the Belgian Consul. The award was made by decree of King Leopold in recognition of Mr. Pannill's long continued activities in the promotion of efficient radio communication at sea.

Ancil Foster **Haines,** vice-president and general manager of the American Mail Line and Pacific Steamship Lines in Seattle, passed away in that city on May 9 at the age of 66.

Mr. Haines was widely known in Pacific Coast shipping circles, first coming here some forty years ago as an employe of a railroad company. Soon, however, he became associated with shipping interests, following that industry for the rest of his life. Dodwell & Co. claimed his services when Mr. Haines entered the field; then, in 1916, he joined the Pacific Coast Steamship Company and Pacific-Alaska Transportation Company when those two companies merged, and he eventually assumed the post of vice-president and manager of the first-mentioned.

It was Mr. Haines who thought of organizing the American Mail Line somewhere about 1922, of which company he was made vice-president and general manager, and to which he devoted practically all his efforts during the past ten years or so.

Ancil Foster Haines

Ten children survive; Mrs. Haines passed away two or three months ago.

After a long number of years in the shipping industry, Captain F. B. Zaddart passed away at his home in Oakland on April 23 at an advanced age. He had been connected with the Pacific Coast coastwise trade and was well known in local circles. For many years Captain Zaddart was in command of steamers operated in the coastwise trade by J. R. Hanify & Co., his last command being the steamer Santa Barbara.

A Modern Suction Dredge

(Continued from Page 40)

An elaborate salt water piping system served by a Nash Engineering Company high pressure pump and with suitable hydrant and hose reel outlets, guards against all general fires. In machinery spaces the carbon dioxide system furnished by Walter Kidde and Company is installed for practically instantaneous fire smothering.

For use when the Pacific is on station a 24 foot motorboat is provided. This boat stows on deck when the dredge is transferring between stations at sea and will be hung on one pair of the lifeboat davits when the dredge is at work on a location.

Much time and study have been devoted to incorporating in this design all of the experience gained in many years of dredging Pacific Coast bar channels.

The Pacific should make a good record in safety and efficiency in this most difficult and most dangerous dredging service. The design and construction of the dredge Pacific is under the direction of Colonel John J. Kingman and Col. T. M. Robins, Division Engineers of the two Pacific Coast Division Offices of the U. S. Engineer Department, and Lieut.-Col. J. A. Dorst, District Engineer of the San Francisco District, is the contracting officer. Principal Engineer F. C. Scheffauer is in direct charge of the work, assisted by Senior Engineer H. D. G. Baxter and Associate Naval Architect H. A. Lennon.

Trade Literature

Electric C.O.$_2$ Meters, catalog 3005 of the Brown Instrument Company, is a handsome black, red and silver booklet of 25 pages describing electric meters for indicating and recording C. O.$_2$ percentages, and flue gas temperature recorders.

The text explains how waste occurs in combustion, and how C. O.$_2$ percentage meters can be used to indicate the best method for eliminating a large proportion of this waste. A double page spread in colors at the center of the book illustrates the operating principle of the meters and the passage of the flue gas samples through the various units.

This booklet may be obtained free on application to Pacific Marine Review.

Winton Power. A beautiful booklet in blue, buff, white and black, illustrating a few of the more important applications of the Winton diesel as a prime mover in industry and in land and marine transportation.

Westinghouse Builder of Marine Equipment. A beautiful white, black, green, blue, and red brochure telling the achievements of the Westinghouse Electric and Manufacturing Company in building, installing and servicing marine power plants of the geared steam turbine type.

Str. Munami, McCormick Lines, After 16 months in the water, there was still a good, tough, elastic film of PABCO ANTI-FOULING PAINT over the entire bottom.

Peace in Maritime Industry

(Continued from Page 23)

worked between 8:00 a.m. and 5:00 pm., with the result that a man who goes to work at 3:00 o'clock in the afternoon works two hours on straight time, and thereafter works at the overtime rate.

● **Seamen's Wages.**

A comparison of wages paid American seamen with wages paid on English and Japanese ships, two of our principal competitors, is very illuminating:

Able-bodied seamen on American offshore vessels receive $72.50 per month and found; English seamen of same class, $40.00 per month; Japanese seamen of same class, $16.00 per month.

Boatswains on American ships, $100.00 per month; English boatswains, $47.00; Japanese, $21.00.

First mates on American ships receive from $180.00 to $210.00, depending on the class of ship; English. $102.00 per month; Japanese, $39.00 per month.

Chief engineers on American ships receive from $265.00 to $390.00 per month; English, $134.00; and Japanese, $60.00.

● **Difficulties Facing the Future.**

There are many difficult questions yet to be settled and much ill-will and distrust to be overcome before these questions can be settled on their merits. For example, if the agreement on sling loads is not ratified, and if the I.L.A. continues its program of reducing sling loads through job action in an effort to arbitrarily increase employment by reducing man-hour production, we certainly are in for more trouble.

It has been the longshoremen's contention that the maximum load to be carried in a sling must be limited in order to prevent speed-up methods by the employers. The employers, on the other hand, have contended that the unions, through job action and refusal to handle reasonable loads, have reduced the production per man-hour to an unreasonable point. The so-called speed-up system apparently now is working in reverse English, and has become a slow-down system.

In a recent article in the Yale Review, Paul Eliel stated that, according to a study by certified public accountants, the efficiency of longshore labor on the Pacific Coast, measured in terms of tons per man-hour, decreased more than 33 per cent between 1933 and 1936. This means that it now takes three longshoremen to do the work which two men did in 1933. Some labor leaders frankly have admitted that it is their program to arbitrarily reduce production in order to create more jobs for more men, without respect to the question of whether the loads are reasonable or the costs excessive.

When one considers that loading and unloading costs are estimated at 30 per cent of direct operating expense, one will realize why ship operators, who are in competition with other forms of transportation for a part of their business, are highly agitated on this subject.

(Page 62, please)

● Lack of Discipline.

Another possible cause of controversy is the lack of discipline and efficiency in certain branches of maritime labor and the apparent inability of labor officials to discipline their own rank and file for open breaches of contracts. Wise union leaders recognize that such a state of affairs is bad for the American seamen as well as the ship operators, for in the long run the returns to both depend upon safe operation and efficient service.

Many have asked me how the shipowners can place their faith in contracts and hope for their enforceability in view of the assertion by certain labor leaders that the unions will only keep their contracts so long as it is to their advantage so to do. My answer is that our faith in collective bargaining is founded upon the following considerations: We still believe that the majority of wage earners in America are inherently honest and prepared to abide by any agreements which are fairly arrived at. Despite anything which you may read in certain newspapers of wide circulation on the waterfront, existing contracts and those now under consideration are eminently fair. Furthermore, many union officials do believe in the integrity of contracts, and have indicated their willingness to cooperate in their enforcement, and I think it is safe to assume that labor leaders who do not subscribe to this principle will soon learn that it is just good plain business for the labor unions to keep the contracts which they make.

● The Public Interest.

Finally, there are indications that, irrespective of the attitude of either shipowners or the unions, the public interest has become so great that leading industries, like the maritime industry, which affect the public welfare so vitally, soon will be compelled through legislation to keep their labor relations in order, if they do not do so voluntarily.

The history of the labor movement in other countries, such as England and Australia, indicates that the public eventually loses its patience and insists upon some method of preventing and settling strikes. The fact that labor unions, including those of the maritime industry, do not welcome governmental regulation or intervention should result in the voluntary acceptance of a greater responsibility by the labor unions for the observance of contracts by the unions and by individual members thereof.

I do not predict continued peace upon the waterfront, but I do unhesitatingly say that there is no sound or common sense reason for serious trouble. Notwithstanding the doubting Thomases, I still have faith in the ability of fair-minded men to compose their differences and reduce them to contract form when they put their feet under the table together and negotiate in good faith.

Good faith is the very essence of collective bargaining. Shipping intends to live up to its labor agreements, and is united on a program to secure enforcement of contracts irrespective of cost, for herein lies the only solution for the maritime industry.

(Abstract of an address at the National Maritime Day Luncheon, San Francisco, May 21st, 1937.)

Your Problems Answered

(Continued from Page 25)

ANSWER

Load on the bearing is expressed in pounds per square inch of projected area, that is, a bearing 7 inches diameter and 10 inches long would have 7 x 10 70 square inches projected area.

Good practice seldom exceeds 200 lbs. per square inch, and generally runs from 75 to 150 lbs. per square inch.

QUESTION

High speed bearings are usually lubricated by flooding. What pressure should be used?

ANSWER

From 5 to 25 lbs. per square inch.

Pressure must be sufficient to force enough oil into bearing for cooling and lubricating it, yet not so high as to put too much oil in, causing it to run or splash out, or foam, or overflow the drains.

QUESTION

How can oil at 25 lbs. per square inch carry a load of 150 to 200 lbs. per square inch in the bearing?

ANSWER

There is no relation between the oil pressure as measured by the gage on the supply line and the pressure of the oil film carrying the load.

The oil film pressure is built up by the rotation of the shaft and the oil adhesion to the shaft surface.

Pressure gages have been attached to pipes leading to small holes in the bearing surface under load, and have shown great pressures built up due to the squeezing of the oil film. This pressure builds up until it is enough to carry the load. If it goes higher the clearance increases, letting the oil out faster; thus the pressure and film thickness are stable and adjust themselves to carry the load.

Our next article will discuss bearing design and types and oil specifications.

Free Navigation School

Mariners, yachtsmen and aviators can now learn navigation by an easy and practical method through a course developed by the Works Progress Administration Education Program of the State Department of Education.

Two classes, which are free to the public, will meet each Tuesday, Thursday and Friday evening at 7:30 o'clock, 1421 Sutter Street, San Francisco, where enrollment can now be made on these evenings. Ernest Bosch, widely known as a mathematician and instructor of sciences, will conduct the class.

Through an artificial horizon, sextant observations of the stars, planets and moon will actually be practiced in the classroom studies. Calculations will be worked up by the most approved and simple methods, which do not require an extensive knowledge of mathematics.

Portland Port Notes

(Continued from Page 44)

Portland's Terminal No. 4, the Italian motorship Feltre, sunk in collision February 17 by the Edward Luckenbach, became the object of a libel action in early May when Pacific Salvage Company sought to collect $200,000 damages from the ship's owners and underwriters for delivering the vessel to drydock.

The vessel had been at the drydock for four weeks, the patches strengthened on her sides, and she had been put back in the river to lie alongside the dock until a contract for her repair had been awarded.

Bids opened May 3 revealed the Albina Engine and Machine Works, Portland, as lowest bidder, asking $328,157 and 110 days' time to complete the work specified.

Whether the owners and underwriters would permit the vessel to pass into the possession of the salvage company, or would redeem the vessel and repair her, was yet a matter of conjecture.

● Traffic Bureau Reorganized.

The Port Traffic Bureau, operated jointly by the Portland Chamber of Commerce and Port of Portland Commission, has been reorganized under the name of Port Traffic Development Bureau. It remains a joint operation but as an autonomous body, with Lloyd Wentworth, lumberman, as its president, and Fred H. Reese as secretary and manager. Representing the Chamber of Commerce on the Bureau are L. W. Hartman, Walter W. R. May, and Mr. Wentworth, while the Port Commission is represented by John H. Lewis, Miles Standish, and J. P. Doyle. The purpose of the bureau is to carry out the functions alluded to by its new name, port traffic development.

● Drydocks Keep Busy.

Port of Portland Drydock has had the busiest period in its history since the recent maritime strike, an average of two vessels a week being raised for repairs and hull cleaning and painting. Eleven of the vessels were States or Quaker Line ships, and six were vessels recently purchased by the Coastwise Line from Swayne & Hoyt, Ltd.

● Portland Port Personals.

Dan E. Gould, assistant general freight and passenger agent of the American Mail Line and Dollar Line here for several years, has gone to Seattle to handle the affairs of the Pacific Terminals, Inc., dock, vacated after Pacific Steamship Lines suspended.

Myron W. Caskey has assumed the position of assistant lighthouse engineer for the 17th lighthouse district, succeeding G. C. Balzer, who was transferred recently to Milwaukee, Wis. Caskey came here from St. Louis, Mo.

Frank M. Sweet, Astoria harbormaster and Lloyd's representative, has been elected chairman of the State Board of Pilot Commissioners. He is the oldest member of the Board in point of service.

Los Angeles Notes

(Continued from Page 45)

Henry Morin de Linclays, manager of the French Line for United States and Canada, was guest of honor at a Biltmore Hotel luncheon, May 6. Introduced by **Gilbert Macqueron**, Pacific Coast manager for the French Line, de Linclays paid a very high tribute to the energy and enthusiasm displayed by Los Angeles in developing its port and its world commerce.

Foreign Trade in April. The Chamber of Commerce Marine Exchange reports that foreign commerce through the port of Los Angeles during April, 1937, amounted to 614,247 tons, valued at $21,378,993, as compared with 447,330 tons, valued at $16,364,783 for April, 1936, and 593,401 tons, valued at $24,023,547 for March, 1937.

Direct Alaska Service. On May 17 the Northland Transportation Company's vessel North Pacific cleared for Alaska via San Francisco and Seattle, after loading cargo for direct delivery at those two ports and at Ketchikan, Wrangell, Petersburg, Kake, Port Althorp, Seward, and Sand Point.

Bulk petroleum shipments from Los Angeles harbor have been gradually rising, with rather wild fluctuations during weekly periods. For instance, the last week in April totaled 1,841,000 barrels, as compared with 860,957 barrels for the previous week. Of this total, 84,000 barrels went to Atlantic Coast domestic ports, 755,970 barrels to Pacific Coast domestic ports, and 641,552 barrels to Pacific foreign ports.

Automatic Control Perfected for Compressors

Automatic start-and-stop control, combined with automatic loading and unloading, can now be obtained without additional equipment on motor-driven single-horizontal compressors, by using the magnetic unloader introduced by Worthington Pump and Machinery Corporation. No extra piping, valves or other devices are required.

This device operates on standard electric equipment and can be installed wherever a conventional automatic starter is used for controlling the compressor motor. The only other provision necessary is a pressure switch to operate a pilot circuit. The pressure switch control is transferred electrically from the motor starter to the magnetic unloader, and either position may be selected at will. If connected to the motor starter, the compressor starts and stops on the demand for air. When connected to the magnetic unloader, the compressor runs continuously and simply loads and unloads, depending upon whether or not air is needed. If desired, the cooling water supply can also be automatically controlled.

Another unique feature in the design of this unit permits it to function as a starting and stopping unloader.

Book Reviews

The Maritime Subsidies, by John Nicolson. A 250-page book bound in buff buckram with gold stampings, published by John Nicolson at 22 East 29th Street, New York.

This volume on its title page describes itself as "The Maritime Subsidies under Titles V and VI of the Merchant Marine Act of 1936, including relevant provisions of other portions of that Act; also of the Shipping Act, 1916; and of the Merchant Marine Act, 1920—with analytic and expository comments by John Nicolson, formerly Special Counsel of the United States Shipping Board and director of several Bureaus of the Board charged with promotional work in aid of private lines."

The arrangement of text and the treatment of the content of the Merchant Marine Act are clear, incisive and logical. An extended table of contents and subject matter index make reference easy to any given section or subject.

It will be noted that the title page, as quoted, omits any reference to the Merchant Marine Act of 1928. This is explained in an epilogue reading thus: "Status of the 1928 Act. From the viewpoint of the private owner, the Merchant Marine Act of 1928 may, for all practical purposes, be considered as though it had been expressly repealed in its entirety. . . . . The 1928 Act is as the pins at the alley's end, into which Congress rolled a great ball in the form of the 1936 Act, and nothing remains of the 1928 Act but deadwood.

"It is for the above reasons that the 1928 Act was not included in our statement 'The Shipping Act 1916; the Merchant Marine Act 1920; and the Merchant Marine Act 1936; jointly constitute the charter of the Federal Maritime Commission.'"

This book should be on the desk of every American shipowner, ship operator, or student of shipping matters.

The Metal Cleaning Handbook, by Robert W. Mitchell, Ph. D., 220 pages, profusely illustrated, bound in paper covered boards, with elaborate photographic decoration, published by the Magnus Chemical Company. Price $1.00.

During recent years detergent or cleaning processes for industrial metal products have become important cogs in production schedules. They have therefore received considerable attention from research experts, and many new improvements have been introduced and new processes developed. So great has been this progress that today metal cleaning in industry meets all demands for speed and efficiency.

This book was prepared as a handbook guide and general reference work on metal cleaning. Its use should be very valuable, especially to small industrial concerns who cannot afford to maintain their own laboratories. It is filled with useful information well indexed for ready reference, and covers its subject with adequate completeness.

In the Ship's Wake

An early May arrival in New York as Philip E. McIntyre, formerly 'estern traffic manager of I. M. M. Chicago, who immediately took er his duties as assistant general eight traffic manager in the main f ce of the company, 1 Broadway.

The marriage in Lima, Peru, of iptain Jake Reznik took place the iddle of last month, when he claim- as his bride Senorita Rosita Ar- r), member of a prominent South merican family. The groom is one the best known and most popular Grace Line's younger masters. He captain of the Pacific Coast-South merican carrier Cuzco. The ro- nce was known to shipmates for veral years.

Captain Reznik began with Grace ne as a deck boy, from which he se to command of his present ship.

When the Tatsuta Maru sailed re- ntly she had on board K. O. Taka- shi, manager of the San Francisco office of N. Y. K. Takahashi left to attend the conference of his company's executives in Tokyo, where managers from offices throughout the world have been called.

Also on the Tatsuta Maru is Minoru Ikoma, manager of the Seattle office.

Takahashi is making his first trip to Japan in 13 years, during which time he has headed the London, New York, and San Francisco offices. Ikoma has been with the company in America as executive for 18 years without a visit to Japan.

Matson Line has appointed R. F. McDonald as claim agent in the freight department of the Los Angeles office, it was announced by C. S. Booth, the appointment already having become effective. McDonald had been claim agent for the company during the past 12 years in the Honolulu office. He was transferred to Los Angeles to fill the recently established position of claim agent.

When the California, big Panama Pacific liner, arrived here from New York she had a new skipper on the bridge . . . Captain William B. Oakley, on his first voyage with the line. He was transferred from the United States Lines.

Captain Fred E. Anderson, retired commodore of the Dollar Line fleet, left on May 19 for a visit to his old home in Sweden, accompanied by his wife. He has been making trips back home every decade for the last forty years, and, although in his seventieth year, hopes to make at last two more trips.

Since his retirement, after fifty years of active sea duty with an unblemished record, Captain Anderson has been living at his home in Alameda. His last command was the President Hoover, whose arrival he never misses when he is in San Francisco on that date.

During their stay in Europe the Andersons will visit Finland, England, France, and Italy, returning home in the summer on one of the Dollar Line's round the world cruisers.

PACIFIC MARINE REVIEW ADVERTISERS

PACIFIC MARINE REVIEW

JULY
1937

American-Hawaiian's
S. S. Kentuckian at
the Golden Gate

Official Organ
Pacific American
Steamship Association
Shipowners Association
of the Pacific Coast

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PACIFIC MARINE REVIEW

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Editorial Comment

The New Deal in American Shipbuilding

"The applicant agrees that, during the period of this agreement, promptly and with due diligence and in a manner satisfactory to the commission it will endeavor to:

"(a) Formulate and develop a long-range program (including necessary financing) satisfactory to the commission for the replacement of all vessels over fifteen years of age:

"(b) Devise plans satisfactory to the commission and the Navy Department for the first of the new vessels required to be constructed by the long-range program;

"(c) Take such further action as the commission may require in order to enable the commission to advertise for competitive bids for the construction of such vessels.

"The applicant agrees to make such reports and to furnish such information with respect to the foregoing matters as may be required by the commission from time to time. Failure to make such reports or furnish such information promptly or to carry forward with due diligence and in a manner satisfactory to the commission any action required by this article shall be a breach of this agreement."

The above is part of a six months' temporary contract which is proposed by the Maritime Commission in lieu of cancelled postal contracts.

Several American ship operating firms have already signed these agreements and several more are about to sign. Since the great majority of the ships owned by these ship operating firms are already over 15 years of age, it is evident that these agreements will mean a prompt start on a large replacement program.

June 30, 1937, is the dead line for postal contract payments, and the issue therefore becomes immediately imminent.

Under this new deal for the shipowner and the shipbuilder, the Maritime Commission agrees to pay the shipbuilder the difference between the American shipbuilding cost and foreign shipbuilding cost up to 50 per cent of the American cost. The Commission also agrees to loan the shipowner, at low rates of interest, up to 50 per cent of the balance.

If the ship is in the foreign trade, and is entitled to operating subsidy, the Commission agrees to pay the difference between the American ship and her foreign flag competitor in routine operating costs such as: Insurance; crew's wages; subsistence; certain repairs.

This operating subsidy is granted on an annual basis with annual audit and adjustment, and with very definite limits on allowable salaries, possible dividends, and diversion of earnings to surplus and depreciation funds. Undoubtedly there will be many wrinkles to iron out in the operation and promotion subsidy sections of the law.

The building subsidy section, however, is fairly simple, and if kept free of official red tape should result in a large shipbuilding program. The tonnage requirements have been variously estimated at from 200,000 gross tons to 350,000 gross tons per annum for the next ten years in the foreign trade services. This, added to normal coastwise and intercoastal requirements, and to the large naval program under construction and in prospect, indicates a very fine prospect ahead for the American shipbuilder.

The six per cent differential granted to Pacific Coast shipyards in bidding on ships that are asking for Building Subsidy and that are to be operated from Pacific Coast ports gives the shipbuilders of the Pacific Coast an equal break in estimating costs and figuring on bids.

The recent enactment of a California law exempting ships of 1,000 tons gross and over, built in California shipyards, from the payment of the 3 per cent sales tax takes that handicap from the California shipbuilder.

This means that if all the Pacific Coast ship operating firms now under postal contract sign up on the new subsidy agreements there will be a great shipbuilding boom on the Pacific Coast, and every existing yard will be full of work.

The going yards of all the shipbuilding districts on the Pacific Coast are fully alive to this promising future, and are devoting much thought and capital to preparation for this expected deluge of new construction.

A casual survey of Pacific Coast operators' needs under a five to ten year replacement program indicates eight to ten cargo and combination cargo and passenger vessels a year for the offshore trades, and certainly as many more for the intercoastal and coastwise trades.

We conclude that the patient and long hungry Pacific Coast shipbuilders are about to enter a period of great activity, with excellent chances of making fair profits and producing good ships.

Notable Words of Wisdom

"The strongest bond of human sympathy, outside the family relation, should be one uniting all working people of all nations and all tongues and kindred. Nor should this lead to a war on property, or the owners of property. Property is the fruit of labor; property is desirable; property is a positive good in the world. That some should be rich shows that others may become rich and hence is a just encouragement to industry and enterprise.

"Let not him who is houseless pull down the house of him who has one, but let him labor diligently and build one for himself, thus by example assuring that his own shall be safe from violence when built."

—Abraham Lincoln.

New Naval Architects

On June 10 the Webb Institute of Naval Architecture, New York, held its 41st annual commencement exercises and granted degrees of Bachelor of Science in Naval Architecture and Marine Engineering to 16 young men. This Institute is the only school in America specializing exclusively in a curriculum for marine engineering and naval architecture. It occupies the site of the famous Webb shipyard, which turned out many of the finest American sailing vessels and steamers in the "clipper ship era" and later. Founded by W. H. Webb, it became the principal beneficiary of his will, and is well endowed with land, buildings, and revenue.

Webb Institute is under the jurisdiction of a board of trustees presently constituted as follows:

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The Institute is managed by Rear Admiral George H. Rock, Construction Corps, United States Navy, retired. Its faculty includes:

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Associate Professor Thomas M. Curran	Naval Architecture
Professor Lyman J. Ballard	Engineering
Professor Jeremy B. Blood	Marine Engineering
Professor Benjamin C. Keeler	Mathematics
Professor John P. Simmons	Chemistry
Professor George E. Haefner	English and Economics
Mrs. Phyllis C. Blood	Librarian

Those receiving the degree of B. S. N. A. and M. E. in 1937 are:

A. Dudley Haff	Richard A. Nielsen
Walter Gerstenberger	Anthony J. Iacobucci
Leo Dzingelevich	Sidney W. Newell
Edward M. MacCutcheon	Edward F. O'Neill
Jack N. Macduff	Richard Grambow
Donald M. Kingsley, Jr.	Archibald H. McComb, Jr.
Joe R. Cloyd	Edward J. Belski
Owen H. Oakley	Edward B. Warchol

Of these men, two are given especial mention in scholarship: A. Dudley Haff, highest honors, with the award of the American Bureau of Shipping prize for highest average scholarship; and Leo Dzingelevich, honors, with the award of the Chaffee Memorial prize for general excellence.

Pacific Marine Review Twenty-Five Years Ago

On June 15, 1912, Number 6 of Volume 9 of the "First Established and Only Exclusively Marine Paper Published on the Pacific Coast" was issued from its office, 379-380 Arcade Annex, Seattle, under its famous motto, "Be just and fear not."

In that issue the name J. S. Hines (present publisher) makes its first appearance in the "Bishop" as Advertising Manager.

Congress was in session, and was urgently demanding: the reasons for the fact that the "United States has less tonnage in the overseas merchant marine than she had 100 years ago"; that "American ships, flying the American flag, should go through the American canal at Panama free of all tolls"; that a "reduction of 5 per cent ad valorem of the customs duties now or hereafter imposed by law shall be allowed on all goods imported into the United States in vessels of the United States"; and that every United States vessel bringing in immigrants "shall be exempt from the $4.00 tax per immigrant now imposed by law."

On May 23, 1912, the huge Imperator, 52,000 gross tons, and then the largest ship afloat, had been successfully launched at the Vulcan Shipbuilding Yard, Hamburg. This ship was the first of the Hamburg-American Line's great trio: Imperator, Vaterland, Bismarck—

now Berengaria, Leviathan, Majestic. Their dimensions were, according to Lloyd's Register:

Name	Gross Tons	Length B.P.	Beam	Depth
Imperator	52,022	882.9	98.3	57.1
Vaterland	54,282	907.6	100.3	58.2
Bismarck	56,551	915.5	100.1	58.2

It was recorded that the Mitsui Bishi Dockyard and Engine Works at Nagasaki, Japan, had obtained permission to extend their yard by the reclamation of approximately 10½ acres from the harbor, to meet the requirements in length of ways for the building of a 27,000 ton battle cruiser.

The Jutlandia, first twin screw ocean-going motorship built in Great Britain, had recently run very successful trial trips in the Firth of Clyde, with over 100 shipbuilding and marine engineering experts aboard. She was built by Barclay-Curle & Company, Whiteinch, for the East Asiatic Company, Copenhagen, Denmark, service to Bankok, Siam.

Union Iron Works, San Francisco, had launched the caisson for the drydock at Pearl Harbor, Hawaii, on April 12, and on April 20 this caisson had left for Honolulu in tow of the tug Hercules.

Already, following the Titanic disaster, the British and German governments were consulting on the calling of an International Conference on Life Saving Appliances and Safety at Sea.

On May 28 the hull for a new steel Puget Sound passenger vessel was christened Sol Duc, and launched at the yards of the Seattle Construction & Dry Dock Company for the Inland Navigation Company.

She was a 16 knot ship, 205 feet long, 32 feet molded beam, 14 feet 3 inches molded depth, with 1500 horsepower triple expansion steam engine and two Ballin water tube boilers. This yard was very busy 25 years ago. In addition to the Sol Duc, they had under construction:

1 steel steamer, Potlatch (sister to Sol Duc), for the Inland Navigation Company;

3 U.S. Navy submarines;

2 Chilean Navy submarines;

1 U.S. Army Engineers dredge, Col. P. S. Michie; and

1 steel passenger steamer on order, considerably larger than the Sol Duc, and for the same owners.

The Oceanic Steamship Company of San Francisco had, on June 3, been awarded a contract for carrying the mails from San Francisco to Sydney, Australia, and return, with the steamers Sonoma and Ventura, which had recently been modernized in the Union Iron Works plant, San Francisco, at a cost of over $700,000.

The C. A. Smith Lumber Company, of San Francisco, California, and Marshfield, Oregon, were building a new lumber steamer at the Newport News Shipbuilding & Dry Dock Company's yard. This vessel was designed to be loaded with lumber under a gantry crane which straddled the vessel at her specially built dock. This firm had also awarded a contract to Chas. C. Moore and Company for a complete power plant installation at Marshfield, Oregon.

Announcement was made of the first practical installation of the Barlow Wharf Elevator, which had recently been erected and tested at the Coleman Dock in Seattle.

Recollections of Earlier Days

Through the courtesy of J. M. (Jack) Bond, vice-president and manager of the International Paint Company (California), Inc., we have been privileged recently to look over their old ledger, entitled, "Ships -- Compositions 1897—1901." On the pages of this book appear many of the best known steamers and sailing ships, whose names were household words in the old San Francisco of pre-fire days. Among these we note

Steamer George Loomis. Built at the Union Iron Works, 1896, as the first Pacific Coast tanker, she carried 6500 barrels of oil at 9 knots sea speed.

Bark Annie Johnson. One of Captain William Matson's first ships in the trade between San Francisco and Honolulu.

Tugs Fearless and Relief, of the old Spreckles Tug Boats fleet.

Steamer Columbia, of the Oregon Railway and Navigation Company, the first steamer in the world illuminated with electric lamps, and the first commercial installation of Edison's system of constant voltage electric generators parallel wiring and incandescent lamps. Built for Pacific Coast service by John Roach in 1880.

Pacific Coast Steamship Company is represented by the steamers Umatilla, Walla Walla, State of California, Queen, Geo. W. Elder, City of Puebla, Santa Rosa (alias Holy Roller), and others.

Union Iron Works. Even that old work horse, the tug Union, had to get an occasional cleaning of her bottom and a coat of anti-fouling.

Oceanic Steamship Company bought much paint for steamers Zealandia, Sierra, Sonoma, Ventura, and Australia.

Many British ships and barks have well known names; for example:

Blairmore (the ship that turned turtle at her dock and was raised again).

Ship Falls of Clyde and *Bark Marion Chilcoot,* afterwards converted to tankers by the Associated Oil Company.

Antiope, Euterpe, Amarapoora, Star of Italy, Star of Bengal, and many others.

There were also many French barks, Hawaiian ships and barks, and German, Austrian, Belgian, Norwegian, Russian, and Salvadorean ships, barks, and steamers.

In short, by a liberal use of the imagination, one might reconstruct from this ledger a very fair picture of the lively shipping in the port of San Francisco at the opening of this century.

. . . . *Some Effects of*

Welding on Ship Construction

By James B. Hunter

Heaa of Hull Technical Division, Fore River Plant,
Bethlehem Shipbuilding Corporation, Ltd.

This paper is intended to describe briefly some of the effects observed in shipyard practice and methods due to the substitution of welding for riveting; it is hoped that this attempt to gather together such effects may prove of interest to the members.

It appears that the subject might best be subdivided into the following groups: Design, mold loft and fabricating shop, erection and fabrication, outfitting and completion, summary.

● Design

The elimination of faying flanges and laps is, of course, the most obvious effect, and is probably the greatest single weight-saving factor. However, it should be borne in mind that the flanges did provide certain stiffening effects and the panel size is in effect greater with welded stiffeners at the same spacing. On the other hand, the elimination of rivet holes in shell and deck connections, for example, gives an approach to 100 per cent strength through a frame line in place of a value of approximately 85 per cent usual with riveting. Some revision of methods for standard strength calculations would appear to be in order, particularly where longitudinal framing is concerned and when comparisons are being made between welded and riveted connections. Care should be used in selection of materials, particularly as regards certain of the high-carbon steels which may be attractive because of higher legend physical characteristics, since these qualities may disappear as a result of welding.

In the race for weight saving, built-up sections have come into common use for stiffeners because of the lack of rolled sections designed for welding. These sections entail greater labor both as to design and fabrication, and it is to be hoped that new sections will shortly be available. The need is obvious, but agreement as to detail is difficult. Inherently such sections should be designed to provide variations in section modulus with the minimum of waste.

Welding has produced a new type of structural plan due to the disappearance of flanges and in some cases laps. This, of course, leads to simplification, but the need of specifying welding in greater detail than is usual with riveted structures somewhat offsets this.

In order to produce proper drawings it is necessary that a working knowledge of welding practice be obtained by the draftsman, since sequence of welding and assembly plays an important part in the practicable avoidance of so-called built-in stresses.

[Paper presented at Spring Meeting of The Society of Naval Architects and Marine Engineers held at Chester, Pa., June 22, 1937.]

One other point in design appears worthy of note, namely, the rigidity of the structure due to the elimination of slippage inherent in riveted joints. In a structure subject to such variation in loading and stress as a ship's hull, this appears to the writer to call for caution in the adoption of welding for the primary strength members, because of the impossibility of relieving any stress in such members after assembly.

It should be borne in mind that a ship's hull is the most intricate and among the largest pieces of structure to be assembled without annealing.

The need of modification of design to enable the maximum amount of prefabrication on the ground or in the shop before erection is evident. This is apparently beginning to receive the attention it deserves. If this is carried to its logical conclusion, then it is possible to visualize the future ship made up of a series of prefabricated units all ground assembled with only the joints between units left to be made actually on the ship.

While the foregoing outlines the principal changes due to arc welding on the basic hull design, many other parts of the vessel are radically affected. Mention should be made of the virtual disappearance of anglesmith work and staples. Instead of elaborate angle staples box-ended and fitted painstakingly around bulbs or flanges, we have today a mitered joint welded together or a simple plate staple welded in place and generally without the use of shims or "dutchmen."

Rigging and deckfittings, formerly involving the use of intricate forgings, can often be replaced by simple welded parts, and today the use of welded bitts and chocks is becoming commonplace, replacing castings. Stems are being fitted of built-up design, and even in stern frames castings are being replaced by weldments. Some of the latter involve the heaviest type of welds and are given careful annealing.

Piping, tanks and valve manifolds, with the necessary elbows and tees, are largely welded on certain classes of vessels, as are hatch, door and airport fittings, boat davits and stacks.

Among the major machinery parts affected, reduction gear and turbine casings are now often made up of a combination of small castings or forgings and plate, particularly when weight saving is important and design is not standardized. Welded shells for condensers and other heat-transfer equipment have largely replaced castings. Boiler drums to meet the higher pressures and temperatures called for today would

hardly be possible without resort to welding.

● Mold Loft and Steel Mill

In the mold loft, of course, no difference is noted in the original laying down and fairing, but the types of molds are changing.

Those for welded construction show only holes necessary for assembly but they must be marked for registration with adjacent members in addition to bevel cutting on the edges where required. Indicating position and size of welds is common practice in some yards, though not in all.

The omission of connecting members, such as clips, calls for much greater care in making templates so that the close fit, so desirable for good welding, may result.

Many yards are today, particularly on the lighter structures, marking templates to show the sequence of welding and erection.

In addition to the individual templates it has been found of advantage to prepare an overall mold for use with prefabricated units to ensure correct outline after assembly and welding.

Steel mill and fabricating shop methods have been very definitely affected by the introduction of welded construction. Laying out now means few holes but more marking to take care of accurate outlines and in many cases location of welds. Check marks are necessary for registration, using waterlines, buttocks, and other indications to locate pieces properly in erection. The use of built-up sections for stiffeners means, in many cases, straightening after welding and very often double layout, one for individual pieces, another for overall.

Present practice indicates the advantage of more assembly in the shop and, if shrinkage is taken into account, more material lifted from the ship.

These considerations indicate certain definite changes in shop layout and equipment. Elaborate punch tables and high-speed punches are hardly justified but more and better planing equipment is needed. Much greater assembly space is necessary, and this should be of the table or platen type rather than the open skids used for shop riveting. Carriage or portable types of machines for drilling and countersinking appear better adapted to this type of work than elaborate fixed machines. Accurate mechanically controlled flame-cutting equipment is a necessity, if costly hand cutting is to be avoided; if production work is of large volume, machine welding with some form of table appears desirable. Some change in furnace equipment also is required to take full advantage of the use of cutting and welding for forming plates, which otherwise would require severe furnace work.

● Erection and Assembly

Erection and assembly procedure has been greatly modified by the use of welding, due primarily to the omission of holes and flanges for fastening individual members together, and also because of the various methods adopted to take care of shrinkage and buckling, particularly on the lighter structures.

The erection of a welded structure requires various attachments for lifting. These include pads and clips and in many cases additional temporary stiffening to take care of free edges. Shipfitters, burners and tack welders must be available because of the closer clearances and the need of positioning on datum lines rather than by registration and fastening by holes and bolts. After welding is completed, all temporary clips, etc., must be removed. The advantages of greater ground assembly can, of course, be obtained only if the crane capacities are large enough to handle the units so assembled, so that for any given yard a balance must be struck between the two for greatest economy.

In assembly, welding in most cases requires greater time due to sequence in order to avoid distortion and the introduction of so-called locked-up stresses. Such sequence usually entails the practical completion of one section before starting work on the adjacent section. This, of course, is in decided contrast to the picture with riveted construction, when riveting gangs can be worked all over the ship simultaneously.

This particular requirement entails a definite control on production all the way down the line, from the drawings to the finished material. In order that it be successfully carried through, complete knowledge of auxiliaries, machinery, etc., which entail substantial foundations and attachments to the structures, should be available at a much earlier date than is necessary with riveting or the erection will extend over a much greater period of time.

The greater amount of erection time also directly affects shipyard capacity and, of course, time of delivery. In the final analysis this may lead to a change in the relationship between shop equipment and the number of building berths.

● Outfitting and Completion

While the popular conception of welding is apt to visualize only the effect on the ship's structure, the history of the application of welding to shipbuilding shows that its first uses were in making attachments of fittings and for the building up and reclamation of worn or badly fitted parts.

Today there are relatively few vessels completed without some welding being used, and the list of uses embraces practically all types of attachments and all kinds of material.

In the manufacture and installation of the hundred and one details that go to complete a vessel today, welding is not confined to the use of the electric arc, but other forms of weld, such as the atomic and spot weld, are in common use.

Welding has largely replaced other means of fastening hangers and clips of all kinds, also small foundations and seatings; in this field it offers definite advantages both as to time and cost, provided the necessary equipment is available.

Power leads and controls are needed on both building berths and outfitting basins. Special precautions against fire are advisable, and different types of mechanics are required.

In testing it will, I believe, be generally found that while leaks are fewer with welded construction their correction will be more costly, since it may be necessary to empty a tank to replace a section of defective weld.

The two shops most affected by the use of welding are the sheet metal and pipe shops, particularly the

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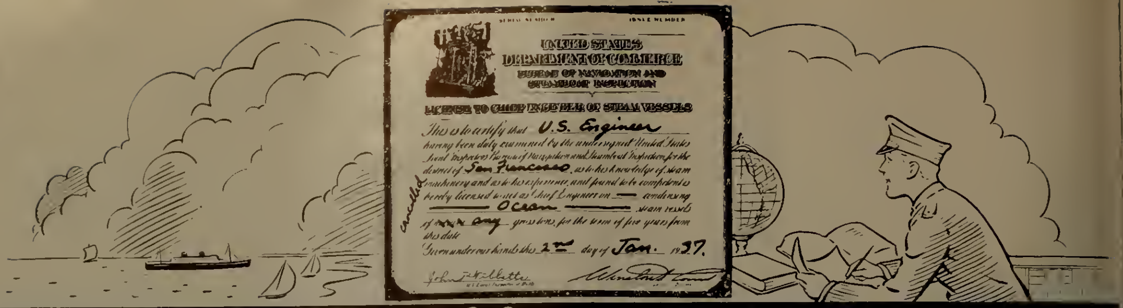

Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

FINAL EXAMINATION
in
Ship Nomenclature
(Written by the retired Professor as he unlaxed at 6 or 7 bells of the graveyard watch the night before.)

Correct the following statements and hand in as a thesis for credit toward your First Engineering Mate's Degree and Master's Ticket.

Charley Noble, 1st Engineer Assistant Mate, ran up the Jacob's ladder leading from his ward room on the main truck in the for'd end of the pilot house, to see what was wrong with Metal Mike in the fire room in the chain locker. As he hurried along the booby hatch leading to the boat deck on the taffrail his toe caught in an open welded seam between two gunwales on the lower deck plates and he pitched backward into the funnel. This accident shut off the flow of water in the circulating pump, which in turn raised the steam pressure to such a high vacuum that the lubricating oil in the condenser overflowed the air pump bucket which a deck swabber had just dropped over the side left. This drove the fuel oil into the scuttle butt, caused the binnacle to shift the sextant so that the condensate pump made the port boss propeller shout "Helm hard right!" The gig painter thereupon "socked" the rudder pintle in the eyes so that the wheel couldn't see which way to turn. The steward's watching tackle was so surprised that he dropped the speed ball just as the anchor slipped off the radio shack. That mishap almost prevented the ship's clock from blowing six pipes in the morning watch to arouse the easy-working master in time to excuse a crew of apple-polishing foreign traders, expected to take this examination. It may have been just as well (sounding), in which case the name on the bow under the overhang would not have been that of

Profeller Nutt.

(Value 10 points on the port bow-er.)

QUESTION

What is viscosity and its importance to marine engineering?

ANSWER

Its principal use is in connection with oils, lubricating and fuel. It is a term used to designate the thickness or body of the oil, and is best explained by describing the standard for its measurement.

In lubricating oils, one of the accepted units of viscosity is the Saybolt scale. Briefly explained, 60 cubic centimeters of the oil are allowed to pass through a small orifice under the pressure of its own head in a tall cylindrical vessel. The time in seconds for a volume of 60 cc. to pass is a measure of its viscosity in Seconds Saybolt. Thus the thicker the oil the higher the number of seconds required. The test is at a standardized temperature; also since the viscosity changes with temperature, the "Seconds Saybolt" reducing with the increase in temperature. All lubricating oils have about the same viscosity at very high temperatures, say 300° F. or more, regardless of how thick or thin they are at room or operating temperatures.

As discussed in our last issue, the heat developed in a high speed bearing is all from liquid or fluid friction, due to the oil drag. The fluid friction is proportional to viscosity, that is to say, the heavier or more viscous, or higher Seconds Saybolt, the more oil drag and fluid friction and the more bearing loss or heating. The conclusion is, then, that we should operate with an oil with as low a viscosity or as low a Saybolt number as possible, being careful to have it thick or heavy enough to maintain the film under the journal.

This has been demonstrated many times on turbine tests, and the overall efficiency of a turbine may sometimes be improved as much as nearly 1 per cent by reducing the viscosity of the lubricating oil.

QUESTION

What is the effect of speed and load on a bearing?

ANSWER

High speed bearing practice is entirely different from slow speed design.

Oil drag is the entire source of heating. The greater the area of the bearing the more oil film there is to be subject to drag or squeeze out. Therefore, for the same diameter and load, modern bearings are shorter, the film area less, projected area less, and load per square inch of projected area is greater. Thus, while in previous designs the loading was from 25 to 75 pounds per square inch of projected area, modern design goes from 75 to 150, perhaps 200, pounds per square inch.

Furthermore, inasmuch as any film pressure or squeeze out of oil film necessary on the side of bearing opposite to the loaded side simply adds to the loaded side, it is necessary to proportion the length of bearing and oil clearance so that there will be as little as possible film load or pressure on the unloaded side of bearing. Heavy oil or high viscosity or overlong bearings builds up this negative film load, which contributes to the heating twice, once on its own or unloaded side of bearing, and once on the normally loaded side of bearing.

Speed of the surface of the journal contributes to heating. Increase of speed increases the rate of oil drag, hence heating. A rough check on size of bearing is to multiply the speed of surface in feet per second by the load in pounds per square inch of projected area and the product should be from 2500 to 5000.

QUESTION

What viscosities should be used?

ANSWER

For turbine lubrication viscosities of 120 to 200 Seconds Saybolt at 100° F. are generally recommended by the manufacturer of oils. If reduction gears are lubricated by the same oil a compromise may be used, going as high as from 200 to 350 Seconds Saybolt at 100° F, thus obtaining better tooth lubrication at the expense of slightly greater heating in turbine bearings.

QUESTION

What temperatures are to be considered limits?

ANSWER

Since increased temperatures give decreased viscosities we should ordinarily run at as high an oil temperature as may be considered safe. Most marine engine room systems involve a circulating oil system with oil coolers. We can control the oil temperature by adjusting the cooling water, and thus the temperature of the oil in the bearings.

Modern bearing designs provide for a much larger quantity of oil flooding through the bearing than is needed in lubrication. The temperature of the oil squeezing out of the film is the temperature we should know. This is, however, mixed with the flood and cooling oil, so that the thermometer in the oil drain from a bearing may not read as high as the actual film oil is. Feeling and measuring with a thermometer the bearing temperature through the opening in the top and comparing with the oil-out temperature will aid the judgment in deciding the proper oil-out temperature.

120° F. may be considered the lowest which should be used, and 140° F. to 150° F. may be considered safe. Bearings have been successfully run continuously at an oil temperature of 190° F.

QUESTION

What makes the bearing temperature increase?

ANSWER

Assuming the same oil-in temperature and nominal quantity, an increase in the oil-out temperature may be due to several factors. The rate of increase is important to know. Sudden increase means a dangerous

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Transposing Equations

From the various inquiries it is evident that the younger members of our profession are not familiar with the procedure of changing a formula around to suit convenience. Thus, suppose the formula is $W = \frac{STE}{RF}$ (new rules), where W is working pressure of shell of boiler; S is tensile strength; T is thickness in inches; E is efficiency of riveted joint; R is radius of shell in inches; F is factor of safety.

We have this formula, or remember it, but unfortunately the question at hand is, what is the thickness in inches, when working pressure is given? We must take this formula as we have it, and change it over to read, thickness T = some value. Here is the way it is done:

Each formula has two sides, the left of the "=" mark and the right of the "=" mark. Furthermore, letters or numbers which do not have a line beneath them, meaning divide, like the W in above formula, may be considered as having a line beneath them and the figure 1 below; thus, W may be also written $\frac{W}{1}$, as obviously we may divide any number by 1 without changing its value. In changing the formula we may take any number above the line on left and put it below the line on right; or above line on right and put below on left; or below line on left and put above line on right; or below line on right and put above line on left.

Thus, in above formula, we have $W = \frac{STE}{RF}$, and we want T to stand all alone so as to find its value from the others. First we move the RF out of the way thus: $WRF = STE$. Then we move SE out of the way, thus: $\frac{WRF}{SE} = T$, which is the desired set up.

When there is a + or − sign in the formula, different rules apply. This will also be discussed if there are further inquiries.

. . . . *Some Recent*

Developments in Marine Diesels

During the past 10 years a tremendous progress has been accomplished in the design, manufacture, and operation of diesel engines for ship propulsion and for ships' auxiliary power plants. This is true for every maritime nation on earth, including America.

In Europe and in Japan the majority of all the vessels built during the past decade have been diesel motorships. In America what few large vessels have been built were largely steam turbine jobs. However, in America we have a large number of competent diesel manufacturers who have been building many diesel engines for public utilities, various industries, work boats, and yachts, and have been consolidating their engineering position, studying the operating problems, and improving their designs. Today the American manufacturer of diesel engines is in much better shape to tackle large marine propulsion plants than at any previous time in the history of diesel progress.

Just to get the picture in our minds in a broad general way before taking up detail progress, let's look at the present statistical situation.

At the beginning of the present fiscal year the total world tonnage in commercial ships of 100 tons gross and over stood in round figures at 64,000,000 gross. The power plants of this fleet of ships are classified as follows by Lloyd's Register:

Diesel engines—12,290,000 gross tons	20%
Steam turbine—9,109,000 gross tons	14%
Reciprocating steam—42,600,000 gross tons	66%

These figures are very significant because they indicate the relative positions of these three prime movers in the race for supremacy in the marine field. The turbine and the diesel engine both became serious competitors of marine steam approximately twenty-five years ago. Reciprocating steam, approximately in its present form, became well established about 50 years ago. That 25-year start is still a big handicap. In the fiscal year 1935-36, of vessels classed by Lloyd's and completed during that period, 23½ per cent by gross tonnage were for reciprocating steam drive, 18½ per cent for steam turbine drive, and 58 per cent for diesel drive. In the fiscal year 1924-25 the reciprocating steam engine was fitted to 65 per cent of the total new tonnage completed.

It is this ten-year trend toward the diesel drive, and the fact that it is gaining in momentum, that interests us. Of the self-propelled vessels, 100 tons gross and over, launched from the world's shipyards in 1936, those intended for steam propulsion numbered 416, with an aggregate gross tonnage of 877,746, while those intended for diesel propulsion numbered 530, with an aggregate tonnage of 1,202,476 gross. The steamers had an average size of 2,110 tons gross and the motorships an average size of 2,268 tons gross.

This aggregate diesel tonnage is made up of ships for every type of service. It includes: more than 50 large tankers, with a total deadweight tonnage well over 600,000; many 10 knot tramp freighters; a large number of fast cargo vessels with sea service speeds up to 18 knots; and several large fast cargo liners, with powers up to 30,000 I.H.P. on twin screws and vessel speeds up to 23 knots.

In July, 1914, there were 297 motorships in service, with an aggregate gross tonnage of 234,287, or an average size of about 800 gross tons. In July, 1936, there were 6,128 motorships in service, with an aggregate of 12,290,599 gross tons, or an average size of about 2,000 gross tons. This shows an increase in number of over 2,000 per cent, an increase in average size of 250 per cent, and an increase in total gross tonnage of over 5,000 per cent, all for the 22 year period. For the 12 month period from July, 1935, to July, 1936, total steam tonnage decreased 1 per cent, while total diesel driven tonnage increased 9 per cent.

These figures, taken all together, indicate that there is among the world's shipowners a very definite and a very general acceptance of the diesel engine as a marine prime mover in all classes of service.

This acceptance is in large measure due to the great improvements made in the design, construction, and operation of marine diesels.

These improvements have been developed along three well-defined lines, which might well be classified under the three words Combustion, Metallurgy, and Mechanism.

Combustion

The original Diesel idea was the combustion of heavy oil or powdered coal fuel inside the engine cylinder, the fuel being injected through a fine nozzle by blast of high pressure air into the heavily compressed air of the combustion chamber. This method produced a fine spray of fuel, which was immediately ignited by the high temperature air in the cylinder and produced fairly clean combustion and very economical operation in fuel consumption per indicated horsepower hour. All the first four cycle marine engines of large size had this type of fuel injection. It required complicated nozzle assemblies, high pressure air pumps, and a rather comprehensive system of air piping on the engine.

The airless injection system, long and successfully in use on the so-called heavy oil engines, has been perfected so that it is now displacing almost entirely the

The American Merchant Marine needs many vessels of the type shown here. Large, fast cargo and passenger carriers with hulls designed for good propulsive efficiency and with ample power in the engine room. This is the motorship Canada; 55 first class passengers, 12,000 tons cargo, 7,000 brake horsepower, 16 knots sea service speed.

air injection system started by Diesel. Some authorities claim that this so-called solid injection system antedates diesel. Be that as it may, this system enables the designers of large marine engines to evolve a simpler engine, giving more power per unit of weight, and occupying less space per unit of power than was possible with the air injection system. So far as combustion is concerned, the air system will, in laboratory experiments or carefully prepared shop tests, give lower fuel consumption and cleaner combustion than the solid injection system, but on board ship any such fractional advantage measured in propeller thrust or shaft horsepower is hardly enough to compensate for the additional weight and space involved.

In this matter of combustion there has been much foreboding over what would happen when the diesel engineers tried to produce large powers in single cylinders. Today many reputable manufacturers are selling six cylinder diesel engines rated from 7200 to 7800 shaft horsepower at 120 revolutions a minute. At least one reliable manufacturer advertises that his engine "can be supplied in powers up to 40,000 horsepower on one shaft."

The perfection of solid injection systems has been largely responsible for improved combustion and general operation characteristics of diesels in the higher speed ranges, and this has been of considerable value to the merchant marine in reducing weights for the power units in diesel electric and geared diesel drives, and diesel generating sets for auxiliary power. It has also enabled the diesel to invade the automotive transport, industrial machinery, and agricultural machinery fields, wherein it has made spectacular progress in recent years. This feature is also of great value to the installations in pleasure craft and lighter work boats.

Metallurgical

Metallurgical science has enjoyed very remarkable advancement in recent years, and the diesel engine manufacturers have used some of the new materials with great advantage. Alloy cast irons and semi-steels in pistons, piston rings, and cylinder liners, and alloy steels for piston rods, wrist pins, connecting rods, valves, valve stems, valve rods, and even for welded frames and cylinder housings, all have contributed to produce stronger and stiffer engines of considerably less weight per unit of power. Much progress has been made through metallurgy in the matter of increasing the ability of piston heads, cylinder covers, valves and valve seats, piston rings, and cylinder liners to stand up under high temperatures.

Among the most recent trends is that towards all welded steel frames and the elimination of cast iron in the strength members of the frame. This has been found of great value in producing a stiff, sturdy, light weight power plant and has been used to advantage in small, high speed as well as large, slow speed diesels.

Mechanism

Under the head of progress in the mechanism of the diesel engine we find a great variety and an increasing tendency to simplification. We would group under this head: all the various arrangements of form and mate-

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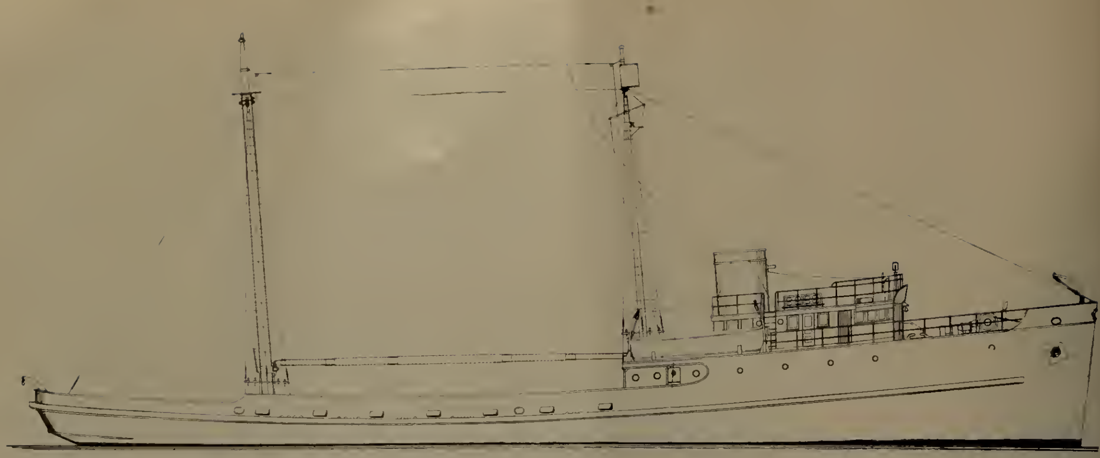
Operators stand in the engine room of the Texas Sun. Note simplicity of arrangements for the control of 5,600 shaft horsepower at 100 r.p.m.



. . . . *Design for a*
Welded Steel Super Tuna Clipper

Through the courtesy of G. Bruce Newby we are glad to be able to publish herewith his designs for all welded steel hull tuna fishing vessel which is the largest thus far designed especially for that service.

Mr. Newby, a well known naval architect of Long Beach, California, is a pioneer on this coast in steel hulls for fishing craft. Over ten years ago, as naval architect of the Los Angeles Shipbuilding Company, he made a thorough investigation of the Southern California deep sea fishing industry and its fishing boat requirements. The result was the design and construction of a steel tuna fishing boat with a length of 112 feet 6 inches, a beam of 25 feet, and a molded depth of 12 feet. Powered with a 350 H.P. Atlas Imperial Diesel, this vessel easily made 10.75 knots speed on her trials. Christened the Orient and now the Santa Cruz, this steel hull is still giving good service in the strenuous deep sea and coastwise fishing.

Steel has many advantages over wood in the construction of vessels, especially when the length of hull required gets up over 100 feet. These advantages are a stiffer hull with greater carrying capacity for the same displacement.

Greater cost has been the main argument against steel hulls. At present that argument is greatly weakened by rising costs of lumber, the rising costs of insurance on large wooden fishing vessels, and the rising costs of maintenance and repair. Today the progressive Pacific Coast fisherman is thinking very seriously about steel hulls. At the present time there are several such hulls in process of construction, and so the production of this new design for a "super tuna clipper" is very timely.

Her general characteristics are:

Length overall	167 ft. 4 ins.
Length for Class	136 ft. 0 ins.
Length between perpendiculars	150 ft. 0 ins.
Beam molded	44 ft.
Depth molded	18 ft. 1 in.
Refrigerated fish hold capacity	800 tons
Three refrigerative units	26 tons each
Propulsion power	1200 shaft horsepower
Speed loaded	$11\frac{1}{2}$ knots
Fuel capacity	114,000 gallons
Cruising radius	10,000 to 12,000 miles

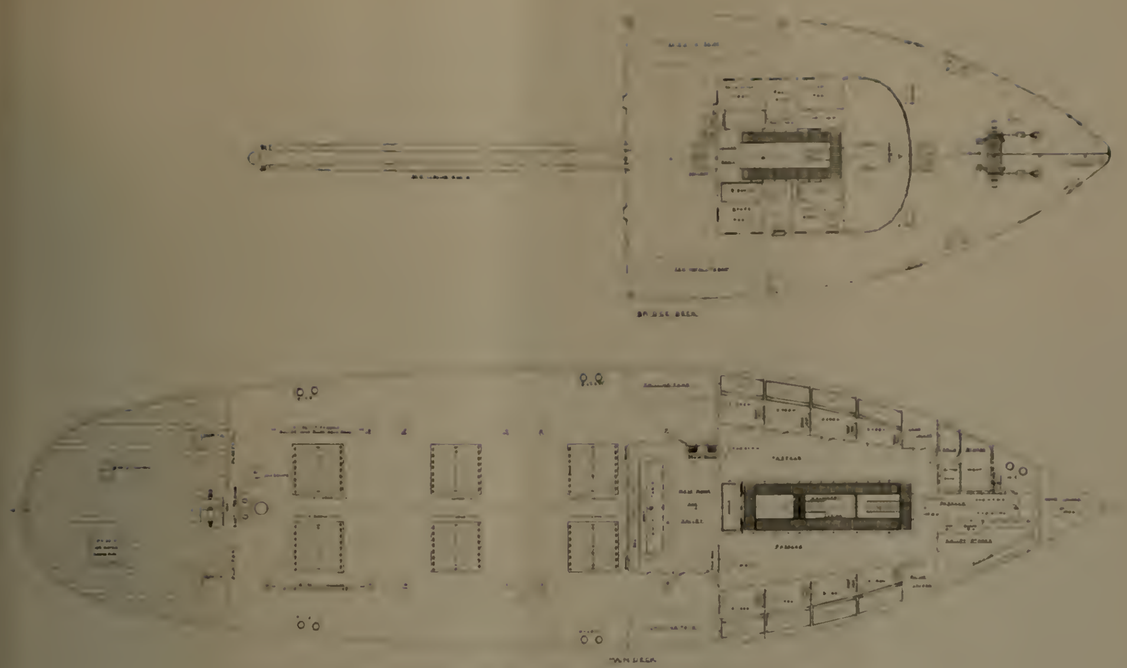
A wooden hull of the same dimensions would carry a maximum of 680 tons fish and not more than half the fuel.

As will be noted from the outboard profile, this boat has a very seaworthy appearance. Her well raked stem with good flare, and long raised forecastle deck, should make her a good dry ship in a sea way. The long main deck aft of the break of the forecastle is entirely clear for the business of fishing and storing the catch. This clear space is lengthened by the well molded overhung counter at the stern. These features in this length of ship give the naval architect a better opportunity to design the underwater body for propulsive efficiency and so save on bills for the owner.

The bridge superstructure, funnel and masts are well proportioned and have the correctly designed rake aft which means so much to the appearance of a ship.

Arrangements for the housing of the crew are carefully planned for maximum comfort and efficiency. Ample space is allotted to this purpose. Some of the features are: Not more than two men in a room; rooms equipped with individual lockers; spacious galley and mess room space; adequate space for refrigerated and general galley stores; fully equipped lavatories and showers; and provision for ample heating and ventilating of each compartment.

The design of this hull for welding assembly indicates a saving of 67 tons in hull weight over the classified riveted construction.



Bridge and main deck general arrangement plans for steel tuna clipper.

Welding in Ship Construction

(Continued from Page 25)

former. The manufacture of small tanks, ladders, wash troughs, metal floor coverings, lockers, dressers, sheet metal doors, sheathing over insulation, metal tables, airport screens and scoops, dresser and counter tops, and the installation of the never ending label plates, to mention only a few items, have been modified until today, particularly in yards engaged on Navy work, one is apt to hunt around for the rivet bin after stumbling over a battery of spot welding machines and being warned off from enclosures devoted to arc and atomic welding.

Piping is today often welded on vessels, and valve manifolds, headers, etc., are built to suit the particular need by welding rather than casting.

Even the shipwrights have not escaped the ever-present welders, as is shown by their work on rail stanchions, booms, side ladder stowage and, perhaps most interesting of all, the fastening of wood decks by means of studs resistance welded to the steel deck.

Supports for joiner work are today largely of metal welded in place, while joiner doors, trim and furniture metal are fabricated by means of welding.

● **Summary and Conclusions**

Conclusions are dangerous and difficult, but, at the risk of making controversial statements, it appears to the author that so far the advantages of welding have been greatest in the case of small vessels, particularly those subject to damage against docks, as it has been demonstrated that fewer leaks develop, and this is a particularly important point for small vessels engaged in oil deliveries. The trend in vessels of this type appears to be definitely towards welding the tank spaces completely, leaving the more complicated ends still riveted. This solution appears rational, since the additional cost and time are justified by the reduced loss of operating time and cost of upkeep. In the larger merchant vessels, welded bulkheads, both transverse and longitudinal, also major parts of the framing and small decks and flats, are being generally welded. These members can be largely ground assembled, leaving comparatively little ship welding, and the weight saving will probably justify whatever extra cost is involved. Units such as bulkheads also lend themselves to production methods, using automatic machines with special assembly methods, although the first cost of such special fixtures must be justified by reduction in cost of the finished unit produced.

The welding of shell and strength decks on larger merchant vessels introduces major problems both as to design and manufacture, and it appears difficult to justify the greater cost and time involved in this. Some weight saving is possible but the difficulties of assembly are serious and the cost increase large.

While it is impossible in a brief note such as this to cover with any degree of completeness so important a subject, and while it is fully realized that methods and procedure used in one shipyard may not apply to others, nevertheless it appears to the author that ultimately yard equipment for welded construction will become as similar in yards producing the same type of ships as did equipment for building riveted vessels. We are still feeling our way in this, and while undoubtedly in some cases welding has been undertaken where it cannot be justified by economic considerations, it will ultimately find its true place in the building of that inherently complex structure—a ship.

Japanese Shipbuilders Busy

There were 152 ships with an aggregate weight of 1,064,830 tons gross, under construction at various yards in Japan at the end of April, according to the latest report, released by the Shipping Club, Kobe. Each of these ships is larger than 1,000 tons gross. The tonnage gained 67,980 tons, compared to the end of March, while the number of ships under construction was increased by five.

Of the total, 111, with 692,130 tons, are freighters; 10, with 168,350 tons, are whalers; and 13, with 93,100 tons, are passenger and semi-passenger ships.

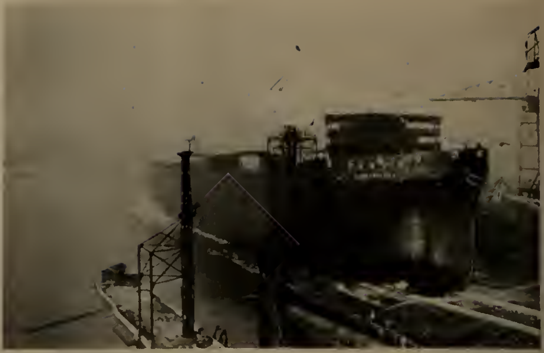
The shipyards, with the number and weight of ships under construction, are listed as follows:

Shipyards	Nos. of Ships	Gross Tonnage
Tsurumi Shipbuilding Yard	6	35,600
Hakodate Dock	3	10,250
Hama Shipbuilding Yard	15	86,400
Kawasaki Shipbuilding Yard	20	231,700
Matsuo Shipbuilding Yard	4	8.250
Mitsubishi Shipbuilding Yard in Nagasaki	17	159,800
Mitsubishi Shipbuilding Yard in Kobe	12	75,600
Mitsubishi Dock in Yokohama	19	124,300
Mitsui Tamatsukuri Shipbuilding Yard	24	164,900
Namura Shipbuilding Yard	3	4,700
Osaka Iron Works	12	98,000
Osaka Shipbuilding Yard	3	5,080
Tochigi Shipbuilding Yard	1	2,000
Urabe Shipbuilding Yard	2	5,000
Uraga Dock	10	52,000
Ohara Shipbuilding Yard	1	1,250
Total	152	1,064,830

● **A Huge Whaler.**

Tonan Maru No. 2, 19,000 tons gross, claimed Japan's largest whaler, built by the Osaka Iron Works for the Japan Marine Products Company, was launched on May 11. It took three months and 12 days to complete the hull. She will be completed by the end of August, in time to operate in the Antarctic during next whaling season.

Tonan Maru No. 2 is 554 feet long, 74 feet beam, and has a displacement tonnage of 35,000. Her speed will be $14\frac{1}{2}$ knots. The unique feature of construction is that the hull is equipped with forty 500-ton whale oil tanks of the latest design, which will enable the ship to be converted readily into the largest tanker in Japan.



Launch of large whaler Tonan Maru No. 2 at Osaka Iron Works.

Marine Diesels

(Continued from Page 29)

rial that are used in transmitting the motions of the pistons of double acting and of opposed pistons in their various types; all the forms of speed and direction control; and all the valve actuating linkage.

Perfection of detail and designing for totally enclosed mechanisms operating in an oil film atmosphere and free from all exterior dirt has brought these various mechanisms to a very high grade of effective frictionless functioning that has helped greatly to increase the mechanical efficiency of diesel engines as well as to give them greater flexibility in control of speed and reversals.

Some Recent Diesel Installations

The highest power marine diesel unit recently installed on an American ship was that for the motor tanker Texas Sun, delivered in May, 1937, to the Sun Oil Company by the Sun Shipbuilding and Dry Dock Company, of Chester, Pa. This is a Sun-Doxford six cylinder engine delivering 5,600 shaft horsepower at 100 revolutions per minute. This unit is of the opposed piston welded frame type with cylinders of 640 mm. bore. The upper piston has a stroke of 850 mm. and the lower piston a stroke of 1,160 mm.

Texas Sun is 511 feet long between perpendiculars, 65 feet 9 inches beam, and 37 feet molded depth. Her total deadweight capacity is 15,800 tons. The big diesel drives her easily at $13\frac{1}{2}$ knots sea service speed fully loaded.

The Sun Shipbuilding and Dry Dock Company has under construction or on order one motor tanker twin to the Texas Sun for the Sun Oil Company and three motor tankers somewhat smaller than the Texas Sun for the Texas Oil Company. This makes a total of 67,600 deadweight tons, which is, we believe, an all time record for motorship building volume in an American shipyard.

European yards have under construction 20 or more big, fast passenger and cargo liners for diesel propulsion. Ten of these are in the range from 18,000 to 28,000 tons gross, with machinery developing 12,000 to 32,000 shaft horsepower. The four largest of the ten

have 20,000 shaft horsepower on twin screws, 24,000 shaft horsepower on triple screws, 27,000 shaft horsepower on triple screws, and 32,000 shaft horsepower on quadruple screws. A design is now being laid down in Germany calling for 30,000 shaft horsepower on twin screws with geared high speed diesel engines.

These figures are cited to show that diesel engines in comparatively standard designs are available in units of sufficient capacity to cover any ordinary propulsion need for any of the world's ordinary merchant carriers.

American diesel manufacturers can easily duplicate these achievements in large diesel engines if given an opportunity. In the smaller and medium size diesels both afloat and ashore American manufacturers have kept right abreast of progress, and in many instances have been instrumental in creating new avenues of improvement.

. . . . *New Type* Marine Diesel Engine

Nunes Bros. and Cosulich of Sausalito, California, are building for G. Pugliese and associates a fine wooden hull purse seiner to be named Caesar Augusto and to be completed September 1, 1937, at a cost well in excess of $40,000. Her hull is 78 feet long by 20 feet beam by 9 feet 6 inches depth.

She will have the usual purse seiner equipment, including: Ets-Hokin and Galvan electric lighting system; CO_2 fire extinguishing system; and Bennett hydraulic turntable-roll drive.

The unique feature of this vessel is her main propulsion unit, which will be the first installation of the new type Fairbanks-Morse four cycle marine engine, fitted with Falk reduction gearing, that attracted so much favorable comment at the last New York power show. The unit is a six cylinder, 8 inch diameter by 10½ inch stroke direct reversing diesel engine, rated 210 shaft horsepower at 720 revolutions a minute. A reduction in speed of 2½ to 1 is effected by the gearing, so that at full power the propeller will turn 288 revolutions per minute. Built into this gearing is the Falk pneumatic clutch, which gives a very flexible adjustment from complete neutral position to absolute engagement at any load.

As will be noted from the illustration, this engine is of a very neat, clean cut design, with no moving part exposed and with a very simple and convenient control.

. . . *Synthetic* Insulating Material

A new synthetic insulating compound has been recently introduced commercially by the General Electric Company under the trade name Flamenol. While similar to rubber in its characteristics, it contains no rubber and will not support combustion.

Termed the most radical cable development in the last 25 years, Flamenol is entirely different from any insulation previously available. In addition to being non-combustible, it is highly resistant to moisture, acids, alkalies, and oils. It has excellent aging characteristics and is strong mechanically.

The properties of Flamenol are such that it can be made a very soft and flexible compound, or made to be one with celluloid-like rigidity. It can be put into solution for coating or impregnating, and can be compounded, filled, calendered, and extruded in much the same fashion as rubber.

Flamenol-insulated cable is recommended for power and control circuits at 600 volts and less, and for operation at a maximum copper temperature of 60 C. It is well adapted to machine-tool wiring, switchboard wiring, and battery and coil leads. Flamenol has a permanently smooth finish and foreign materials do not readily adhere to its surface. It is available in a variety of colors for circuit tracing. For most applications Flamenol is used without any protective finish, such as braid, lead, or armor. It is only where the cable will be subjected to extreme mechanical abuses that such a finish is necessary.

The new type Fairbanks, Morse marine diesel engine as exhibited at the New York power show. 210 shaft horsepower at 720 revolutions per minute. This unit, with its Falk reduction gear and clutch, makes an ideal power plant for work boats.

Recent Practice in Welding Large Oil Tankers

By John W. Hudson *and* T. M. Jackson

The Naval Architect and the Chief Electrical and Welding Engineers, Sun Shipbuilding and Dry Dock Company

For a number of years welding engineers have been engaged in research work which has advanced welding in shipbuilding to the point where it is now recognized by both shipbuilders and shipowners, not with suspicion but as a natural development, as a means of saving weight, and of securing greater simplification and economy in ship construction. By the elimination of indirect connections, rivet heads, etc., the welded structure provides smooth surfaces which permit good drainage and easy cleaning and are subject to less surface corrosion. The advantages and possibilities are practically limitless and at present it is hardly possible to say definitely how far they will lead in altering and modifying present structural design. The natural tendency to hold to orthodox design and to modify it only to the extent that present welding technique and knowledge permit is quite evident, but further on attention will be drawn to a simplified design, which, it is believed, will provide a type of tanker construction both simpler, stronger and more economical than present construction.

A bold initiative, both by the owners and by the builders, was undertaken in February, 1936, when the Atlantic Refining Company placed with the Sun Shipbuilding & Dry Dock Company an order for a tanker 521 feet long, 70 feet beam, and 40 feet depth of 18,500 tons deadweight, in which the entire tank space extending from the engine-room bulkhead to the forward end of the tank space for a length of 353 feet was to be of completely welded construction. In March, 1937, the Atlantic Refining Company placed a repeat order with the same builders, which was followed by an additional contract for a similar vessel for the Sun Oil Company, making at the present time three tankers of over 18,000 tons deadweight with the tank spaces completely welded.

Probably no feature of shipbuilding in recent years has received such intensive research study and bold initiative in design as have these vessels. They show plainly the confidence of both the owners and the builders in electric welding in ship construction.

It is now recognized that electric arc welding has become practically indispensable and that it is a sound and logical means of joining metals, to say nothing of the great saving in weight which in these vessels amounts to about 15 per cent of the total steel. In the design of this vessel, the longitudinal bracketless system was adopted. This system appeared to be the most logical to adopt as it lends itself more readily to our system of fabrication and erection, is a sound type of construction, and relieves the builders as regards design, thus enabling them to concentrate on methods of assembly and of welding procedure. It was evident from the start that welding economy could not be obtained except by machine welding, from which it followed that the welding must be done under cover. This is not only desirable but necessary, as extreme variations in temperature are detrimental, and only under cover could the essential control of uniformity be obtained and the largest assembled sections be safely and conveniently handled, as is the practice in riveted construction at this plant. As a welded structure of this size had never before been attempted, the greatest care and study were given to developing the best method of assembling and erecting the various members in the shop.

It is recognized that more intensive study is required in the design of welded than of riveted structures, as the latter have become more or less standardized. In welded structures two very important matters which must be borne in mind are their great rigidity and the residual stresses caused by heat. To obviate the latter as much as possible, all longitudinal members, such as stiffeners and butts, were automatically welded. This method prevents the penetration of various atmospheric elements into the molten metal, as the weld is made in one continuous operation, avoiding distortion and reducing to a minimum residual stresses in the material. At the same time excellent penetration is obtained, which is probably the most important of all the requirements. Butt welding was adopted in all the main structures, lap welding being used only for bracket connections and joggled vertical panel plates at longitudinal bulkheads in way of transverse bulkheads.

As a tanker, for the largest portion of its length, is practically a series of multiple units; that is, similar tanks, it was decided to commence with 117 feet of the structure consisting of three tanks, each 35 feet long, and a 12-foot pump room. A few modifications from the usual riveted design were adopted for the welded

(Abstract of paper presented at Spring Meeting of The Society of Naval Architects and Marine Engineers held at Chester, Pa., June 22, 1937.)

Table 1.—Automatic Weld Test—Hull Construction

Process Approval by Lloyd's Register and American Bureau of Shipping

Plate material, 55,000 pounds per square inch minimum Analysis Carbon, 0.20, manganese, 0.43, phosphorus, 0.014, sulphur, 0.044. All tests in as-welded condition

Transverse Full Section Tension (Lloyd)

Plate thickness, in.	Yield strength, lb. per sq. in.	Ultimate tensile strength, lb. per sq. in.	Failure
1/2	34,600	58,100	In plate (2 in. or more from edge of weld)
1/2	38,800	58,200	In plate (2 in. or more from edge of weld)
3/4	32,700	68,500	In plate (2 in. or more from edge of weld)
3/4	29,200	60,100	In plate (2 in. or more from edge of weld)
1	27,900	55,500	In plate (2 in. or more from edge of weld)
1	29,400	59,700	In plate (2 in. or more from edge of weld)
Average	32,100	60,000	In plate (2 in. or more from edge of weld)

Required tensile strength, 90 per cent of unwelded specimen

Tension Test, Weld Metal (Lloyd)

Diameter, in.	Yield strength, lb. per sq. in.	Ultimate tensile strength, lb. per sq. in.	Per cent elongation in 2 in.	Reduction of area, per cent
0.505	52,500	69,000	26.0	47.8
0.505	53,750	70,000	25.0	42.8
Average	53,125	69,500	25.5	45.3

Required tensile strength, minimum, 56,250 pounds per square inch Elongation, minimum, 18 per cent.

Bend Test, Weld Metal (Lloyd). Diameter, 9/16 Inch, Length 8 Inches

Two specimens bent full 180 degrees, sides flat together, no failure. Required, 120 degrees without failure.

All Weld Metal Izod Impact, 3 Notch (Lloyd)

	Top notch	Side notch	Bottom notch	Average
No. 1	36.5 ft.-lb.	28.5	47.5	37.5
No. 2	33.5 ft.-lb.	35.0	36.0	34.8
			Average	36.1

Required average value, minimum, 20 foot-pounds.

Shear Test (Lloyd)

	Yield point Actual	Yield point Lb. per lin. in.	Ultimate strength Actual	Ultimate strength Lb. per lin. in.	Failure
No. 1...	126,000	10,500	199,500	16,625	In plate
No. 2...	113,000	9,420	183,500	15,300	In plate

Lloyd requirement, 12,375 pounds per linear inch.

Transverse Reduced Section Tension (American Bureau of Shipping)

Plate thickness, in.	Yield strength, lb. per sq. in.	Ultimate strength, lb. per sq. in.	Failure
1/2	53,100	73,000	In weld
1/2	52,100	72,700	In weld
3/4	56,500	80,400	In weld
3/4	54,000	79,700	In weld
1	47,850	69,700	In weld
1	45,900	76,000	In weld
Average	51,575	75,250	In weld

Required, minimum, 60,000 pounds per square inch.

Free Bend (Weld at Center of Specimen) (American Bureau of Shipping)

1/2 inch, 50.5 per cent elongation in weld, no failure, bent flat
1/2 inch, 45.1 per cent elongation in weld, no failure, bent flat
3/4 inch, 54.0 per cent elongation in weld, no failure, bent flat
3/4 inch, 53.5 per cent elongation in weld, no failure, bent flat
1 inch, 29.7 per cent elongation in weld (no failure at 25 per cent specimens broken for examination)
1 inch, 23.7 per cent elongation in weld (no failure at 22 per cent at request American Bureau of Shipping surveyor)
Required, 20 per cent

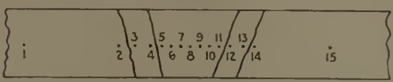
Nick Break (American Bureau of Shipping)

1/2, 3/4, 1 inch Pl—good penetration—no gas or slag inclusions—silky fracture.

Fatigue (Not Required by Lloyd or American Bureau of Shipping)

Endurance limit, 45 to 55 per cent of ultimate strength.

Hardness Test (Not Required by Lloyd or American Bureau of Shipping)



Location	3/4-Inch Thick Coupon R.B.	3/4-Inch Thick Coupon Brinell	1-Inch Thick Coupon R.B.	1-Inch Thick Coupon Brinell
1	84.0	162.0	73.0	132.0
2	82.0	156.0	70.0	125.0
3	81.0	153.0	73.5	133.0
4	81.5	154.0	74.0	135.0
5	79.5	149.0	77.5	142.0
6	79.0	147.0	75.0	137.0
7	79.5	149.0	80.0	150.0
8	80.0	150.0	81.0	153.0
9	79.5	149.0	78.0	144.0
10	80.0	150.0	79.0	147.0
11	80.5	151.0	77.5	142.0
12	79.0	147.0	74.5	136.0
13	79.0	147.0	74.5	136.0
14	74.0	135.0	73.5	133.0
15	73.0	132.0	70.0	125.0

ship, the principal of which was the use of heavy wrapper plates at the bulkheads, at the decks and the bottom and side shell. In accordance with our usual practice the longitudinal bulkheads on this vessel were continuous and the transverse bulkheads intercostal, dividing the bulkheads into three pieces, none of which was too heavy or too large to be handled in one piece.

All of the different parts of the structure were shop assembled in one tank length. The center keelson, rider plate and flat plate keel with the transverse brackets was one assembly and manually welded. The center girder at the deck with the deck plate and transverse brackets was one assembly. The bottom shell from the keel to the lower turn of the bilge together with one wrapper plate, transverses and longitudinals was one assembly. The longitudinals were machine welded, as were also the shell longitudinal butts; the transverses were welded to the shell manually. From the upper turn of the bilge to the sheer strake together with the bulkhead wrapper plate, transverses and longitudinals was one assembly. As in the case of the bottom shell, each plate had three longitudinals, machine welded to the plate. The butts were then welded, forming one complete assembly from the upper turn of the bilge to the deck. The deck plating was treated in a similar manner and was in two assemblies on each side, one from the center-line strake to the inboard side of the longitudinal bulkhead, and the other from that point to the side of the ship. The transverse bulkheads, as previously stated, were in three pieces, the center position and two wings, intercosal between the longitudinal bulkheads. All horizontal stiffeners and butts were machine welded; the webs, which were assembled with the bulkheads, were manually welded.

The longitudinal bulkhead final shop assembly was one tank length. Each plate was treated separately; that is, the longitudinals were machine welded to each plate and then the longitudinal butts were machine

welded to each other, the vertical panel plate was then fitted and welded to the horizontal plates together with the overhanging longitudinals, which were all manual welded. This vertical panel, as will be noted, is joggled and overlapped onto the adjacent plates. This is the only overlap fitted in the large assemblies. The reason for this was that this plate was originally intended to be welded to the transverse bulkhead, making it part of the bulkhead assembly; adjacent plates could then be bolted to the overlap in erection. This method, however, was found to be too cumbersome and was abandoned in favor of the assembly finally decided on as shown in Fig. 6.

In preparing the different parts for welding the following procedure was adopted: The mill scale was removed from all faying surfaces by an emery wheel in order to get down to perfectly clean bright surfaces. The stiffeners or longitudinals were then placed in position, dogged down and tack welded. There were usually three stiffeners to each plate. This plate was then rolled across to the welding tilting table for machine continuous welding on each side. The adjacent plates were treated similarly. The plates with the stiffeners welded in place were then rolled along the welding slabs to the butt welding machine. They were carefully aligned, dogged down and the butts welded. They were then transferred to the manual welding tables; the transverses were then welded by hand. Finally, the bulkhead wrapper plates were fitted and the vertical butt, together with the ends of the longitudinals which overhung the already assembled plating, were hand welded, thus completing one assembled section. In the machine welding operation the plating is fitted close; this prevents the molten metal from running through on account of its intense heat and also gives better penetration. Before final erection the opposite sides of all butt welds are reinforced, either by hand or by portable welding machine; in the case of hand welding, the butt is grooved out and then welded; in the case of portable machine welding, this procedure is not necessary as this machine reinforces the weld without any preparation whatsoever. After reinforcing, the assembled section is then complete and ready for erection.

The erection was carried out in the following order. The first unit was the shop assembled flat and vertical keel, in one tank space lengths, with frame brackets attached. This was followed by the complete bottom shell assemblies, from the flat plate keel to the lower turn of the bilge, port and starboard, in one tank space lengths. In connecting these assemblies to the flat and vertical keel, the bottom transverse frames were bolted to the frame brackets on the keel assembly and the seam of the flat keel and garboard strake was tack welded. Details of construction at the bottom of the webs on both the transverse and longitudinal bulkheads were arranged to permit the entire flat and vertical keel and bottom shell to be placed before any bulkhead was erected.

The complete amidship pump room was next placed in position, the assembly and erection being a modification of that used throughout the tank space. From the amidship pump room the erection was completed one tank space at a time in both directions away from amidships.

For each tank space, the centerline section of one transverse bulkhead was first placed in position. By tack welding the middle bulkhead web to the vertical keel and by bolting the other webs to the bottom longitudinals the bulkhead was temporarily self-supporting. This was followed by the longitudinal bulkhead assemblies, port and starboard, tack welded to the transverse bulkhead and bottom shell, and bolted to the previous section of the longitudinal bulkhead. The webs on the longitudinal bulkhead at the frames were bolted to the bottom transverses.

The center deck girder assembly, with the center strake of the deck and the frame brackets attached, was next hung between the transverse bulkheads. This unit was bolted to the middle transverse bulkhead web at one end and tack welded to the bulkhead plating at the other end. After sufficient temporary support was placed under the center girder, the two side center deck assemblies were placed in position. The transverse beams on these sections were bolted to the frame brackets on the center girder and to the frame brackets previously welded to the longitudinal bulkhead.

The two outboard sections of the transverse bulkheads were next erected, the erection of these members being similar to that of the centerline section of this bulkhead. The bilge plates were not assembled in the shops. These were left until completion of all erection and were the closing-plates of the entire unit. After the outboard section of the transverse bulkheads was erected, the bilge brackets were next put in place and bolted to the transverses erected with the bottom shell. This was followed by the erection of the bilge longitudinals. The side shell plating along with the transverses and one wrapper plate were next erected in position, the lower part of the transverses connected by bolts to the bilge brackets already in place, and tack welded to the wing transverse bulkheads. The outboard deck section, along with the transverses which were bolted to the frame backets already in place, completed the 117-foot unit.

The sequence of final welding the now assembled unit was as follows:

The flat keel seams throughout, port and starboard simultaneously, were first welded, followed by the longitudinal bulkhead connection to the bottom shell. The transverse bulkhead connection to the bottom shell out to the lower turn of the bilge was the next procedure. Following this all transverse butts in the bottom shell plating, including the butt of the flat keel, were welded. Then the overlap of the bottom shell longitudinals on the bottom shell were welded in place. Following this the transverse bulkhead to the longitudinal bulkheads were next welded. The deck plating was next welded, concluding with the welding of the side shell.

In the welding of all butts the back step method was used; in the case of the flat plate keel, for instance, two welders worked on each seam, working away from the center towards the ends, back-stepping the welding. By so doing, distortion and shrinkage were reduced to a minimum.

Dissolving Scale in Diesel Water Jackets

Great interest has recently been taken in scale formation in the water circulating systems of internal combustion engines in ships of all sizes.

Over a period of years different samples of scale have been secured and definite laboratory tests made. Scale compositions have varied from a light carbonate to a heavy calcium sulphate.

Investigation and experience have definitely proved that in more than 75 per cent of failure, due to cracked heads, liners and exhaust valves, the trouble is directly due to scale formation on the cooling surface with, sometimes, complete clogging up of the small water passages in the circulating system. Where fresh water is used in closed systems more trouble has been experienced from corrosion than from scaling. This has been found to be due to the release of carbonic acid gas from the water at temperatures under the boiling point.

This carbonic acid gas is very corrosive and has been found to be the principal cause of very serious pitting of the metal as well as causing a sponge-like condition on the cast iron liners and heads.

The fresh water in the closed systems on various ships was analyzed, using the pH control system and was found to be decidedly acid and hence very corrosive, causing very rapid deterioration on the water side of the cylinder walls.

● Neutralizing Acidity

Various formulae have been in use for neutralizing the acidity of fresh water, in most cases using sal soda, sodium hydroxide or potassium hydroxide. While these chemicals maintained the water in the system in a high state of alkalinity, they deposited themselves on the cylinder heads and other surfaces, and formed a hard insulating scale. This was especially noticed in systems using trisodium phosphate.

The Artic Chemical & Combustion Engineering Corporation of Brooklyn, New York, who have been manufacturing and marketing solvents and cleaners, have made a careful investigation of the scale problem, with reference to internal combustion engines and modern water tube boilers. The object was to obtain a scale solvent or softener which, when circulated through the water passages, will either dissolve or soften the scale to such an extent that it may easily be washed out and at the same time will not attack the metal surfaces so as to increase corrosion, and will not attack gaskets or fittings. The product resulting from these investigations and experiments is called Artgel. This material has been in use for a number of years, with entire success.

● U. S. Navy Tests

When this firm was completely satisfied with their own tests, Artgel was submitted to the United States Naval Laboratory at Annapolis, Maryland, as a "Scale solvent for Water Jackets of Diesel Engine Exhaust Headers" on submarine engines. The conditions imposed were most severe, and after thorough tests Artgel was registered on the United States Navy list of approved materials as a "Scale Solvent, water jacket, Diesel engine."

This solvent is now being used with entire success on both Navy and commercial vessels using both closed fresh water cooling systems and salt water systems.

● Salt Water Systems

It was found that the salt water circulation system presented the greatest difficulties, as not only, due to the low suctions, did the vessels pick up large amounts of mud, but the usual salts in sea water gave large deposits of calcium sulphate, caused by the intense heat, especially on the heads and exhaust valves. It has been demonstrated that Artgel will break down and remove these rock-like deposits, leaving even the small water passages absolutely clean.

In marine steam plants of all types, a major source of annoyance and trouble is the accumulation of carbon scale in fuel oil heaters, lub oil coolers, and in fact any equipment, where oil is used under changing conditions of temperature. The Artic Chemical and Combustion Engineering Corporation have developed a safe non-inflammable material for removing these carbon deposits. This material is called Artsolv. It has been submitted to the Naval Boiler Laboratory of the United States Navy, who report that tests indicated "Artsolv is considered satisfactory for Navy use on badly fouled heaters," and that its corrosive tendencies were negligible.

● Both Solvents Safe

In the use of Artsolv, in the close atmosphere of the engine room, no poisonous or offensive gases are evolved, making the material perfectly safe so far as the health of the operatives are concerned. This solvent has been in use for some years by both Government ships and leading commercial shipping entering San Francisco harbor.

Both Artgel and Artsolv are used cold, and have been found to be positively effective as well as safe solvents in their respective fields.

Artsolv has been approved by the Bureau of Marine Inspection and Navigation "without restriction" as safe stores or cargo on passenger carrying vessels.

The Artic Chemical Sales Company, San Francisco, are the Pacific Coast agents for all products manufactured by the Artic Chemical & Combustion Engineering Corporation.

America's First Kort Nozzle Installation

To the owners of vessels engaged primarily in trawling or towing operations, the test results of the first Kort Nozzle installation in the United States should be of special interest.

Bethlehem Shipbuilding Corporation, having recognized the merits of the Kort Nozzle, has spent considerable time during the past two years in studying its technical features, in reviewing and investigating the results of similar installations made abroad, and in arranging lectures for the purpose of acquainting vessel owners with its application.

The Boston Plant (Atlantic Works) of the Bethlehem Shipbuilding Corporation recently completed the application of Kort Nozzle Drive to the diesel driven steel trawler William J. O'Brien, owned and operated by R. O'Brien & Company, Boston, Massachusetts. This installation was made with the agreement and cooperation of the Kort Company, Inc., of America, who furnished the design and engineering essential to the application of this device.

The trawler William J. O'Brien, built in 1928 at Bethlehem's Fore River Plant, has an overall length of 122 ft. 6 inches, with a breadth of 23 feet, and a depth of 11.6 feet, and is propelled by a four-cylinder, two cycle diesel engine of Bethlehem design and manufacture, having cylinders 14½ in. by 21 in. and rated 380 B.H.P. at 250 r.p.m. The propeller in use at the time the boat was removed from service was a three-blade bronze wheel 6 feet 6 inches in diameter with a constant pitch of 4 feet 9 inches.

Before proceeding to drydock for the installation of the nozzle, trials were run for the purpose of obtaining performance data that could be used for comparison with the performance after the Kort Nozzle was installed.

On December 16 and 17, a series of standardization runs was made on a course between buoy eight, off Governor's Island, and buoy two, off Spectacle Island, in the lower reaches of Boston Harbor, and a curve of speed versus horsepower plotted.

After completing the speed trials, an economy run was made and fuel measured in the day service tank for full speed condition. Following this, a test was made to determine the time required for the ship to make a complete circle at full speed with the rudder hard over.

On December 18, a test of bollard pull was made at the Atlantic Works, and for this test a dynamometer was made fast to a bollard on the pier and a 600 foot wire hawser rove through the pulling eye, the two ends being carried to mooring bitts on either side of the vessel, thus giving a tow line length of 300 feet.

The dynamometer used was of the hydraulic piston

Side view of Kort nozzle.

type, and gage pressures were read at given intervals upon signal from the vessel. Indicator cards were taken and pertinent engine room data recorded simultaneously.

Upon completion of these tests the vessel was drydocked, underwater body cleaned and painted, and the Kort Nozzle conversion was made, as shown in the illustrations.

It is worthy of note that the nozzle proper was laid out and fabricated complete without making molds or lifting templates from the ship's hull, and this fact saved considerable time in installation and consequently in drydock charges.

In addition to installing the nozzle the rudder was changed, a streamline rudder of slightly greater area and added balance replacing the original one of single plate design. The old three-blade propeller was replaced by a new one of the same material and diameter, but having four blades with variable pitch, the pitch at .7 radius being 5 feet 1.7 inches.

On January 3, the vessel proceeded to the Boston Fish Pier to ice up and take on water and supplies

preparatory to resuming her regular schedule. This necessity for immediate return to service was unfortunate, because it necessitated a departure from the conditions of the first trials, the draft being increased from 6 ft. 6 in. forward and 11 ft. 2 in. aft to 7 ft. 6 in forward and 11 ft. 4 in. aft. This increased the displacement from 346 tons to 377 tons. The immediate demand for the vessel's services further affected the completeness of the comparative tests by making it necessary to omit the economy run and steering test, and cut down the number of speed runs to three.

Speed runs were made over the same course, then the vessel returned to the Atlantic Works, where the bollard pull tests were carried out in the same manner followed in the pre-conversion tests.

The comparative results obtained from the various tests are of great interest, as tending to confirm the reports in current technical literature concerning the success of the Kort Nozzle in Europe. These tests show that when running free the indicated horsepower required to give the William J. O'Brien a speed of 5.5 knots was 23 per cent less, and at 8.9 knots, 29.5 per cent less, when equipped with the Kort Nozzle, than the power required for the same speeds before its installation, although the draft and displacement were greater. Stated in terms of speed gain for a given horsepower, it may be noted that at 400 I.H.P., there is a speed increase of seven per cent, equivalent to .6 knots.

Reference to the curve of bollard pull shows that, with the nozzle installed, there was an increase of pull amounting to 27 per cent at 440 I.H.P. and 64 per cent at 200 I.H.P. Stated in another way: to produce 4800 lb. bollard pull, 40 per cent less power was required, and for 13,000 lb. pull, 28 per cent less power was required.

It should be noted that the tests on the William J. O'Brien were not wholly conclusive as to amount, due to the fact that the I.H.P. was measured on only one cylinder and the power of the other cylinders estimated, and therefore the speed tests were not carried out under identical conditions of time, power and bottom condition; however, the results show about the same improvement in pull and speed as reported from tests conducted abroad.

A point of interest in connection with the O'Brien is that an important feature of the trawling service in which the vessel is engaged is the period following each set, during which the trawl is towed. The opportunity was not available to carry out comparative towing tests, but trial reports from European vessels which are Kort equipped indicate the per cent improvement in the bollard pull of such vessels to be about twice as much as the per cent improvement in towing pull. On this basis, if the towing power of the O'Brien while trawling is 440 I.H.P., the increase to be expected in towing pull will be about 13 per cent, since the bollard pull test showed 27 per cent improvement for this power.

Making allowances for inaccuracies introduced by the test conditions previously mentioned, it may be definitely concluded that the combination of Kort Nozzle, propeller, and streamline rudder will effect a marked improvement in the vessel's operations.

This improvement may be capitalized in reduced power, with corresponding reduced fuel consumption for a given speed, or a given towing power, or in increased speed and towing power with the same engine power.

View of stern of trawler William J. O'Brien, showing Kort Nozzle in place.

I.M.M. Annual Meeting

At the annual stockholders' meeting of the International Mercantile Marine Company, which was held June 7 at the Hudson Trust Company Building, Hoboken, N.J., all of the members of the present board of directors were re-elected for the coming year. Membership of the board includes: Vincent Astor, Harry Bronner, Howard Bruce, J. M. Franklin, P. A. S. Franklin, Herman Goldman, J. W. Hanes, Basil Harris, Cletus Keating, Kermit Roosevelt, Charles A. Stone, Donald Symington, and Elisha Walker.

P. A. S. Franklin, chairman of the board, made the following statement concerning the company's affairs:

"On June 29, 1936, the new Merchant Marine Act, 1936, became law. Under the terms of this Act all mail contracts held by American shipowners are to be terminated on June 30, 1937. United States Lines Company, our principal subsidiary, holds two mail contracts, and we are now in negotiation with the United States Maritime Commission for adjustment of our claims, due to the cancellation of our mail contracts, and to secure an operating differential in connection with the operation of the United States Lines fleets and a construction differential for the building of our new ship.

"The negotiations thus far have indicated very clearly that the United States Maritime Commission will insist on the United States Lines Company conducting its own operations. At the present time the International Mercantile Marine Company, the parent company, has been acting as managing agent and operator for the United States Lines Company under a contract which expired last December."

Pacific International Trade

● Japan Busy.

Food Exports: An indication of the part played by foreign trade in the production of Japanese foodstuffs is evidenced by preliminary statistics for 1936 on Japanese packs of certain sea foods, which show that more than 90 per cent of such foods were shipped to foreign markets during the year, according to statistics compiled by the Japan Tinned Foods Association.

These statistics show that, of the 2,401,443 cases of salmon packed during the year, 1,847,863 cases were exported. The statistics for four other fish foods were reported as follows: Tomato sardines, output, 1,303,627 cases, exported, 1,110,873 cases; taraba crab, output, 341,060 cases, exported, 325,823 cases; tuna in oil, output, 380,263 cases, exported, 374,932 cases; tuna boiled, output, 93,847 cases, exported, 90,123 cases.

Shipbuilding Activity: The shipyards of Japan have under construction at the present time over a million gross tons of merchant shipping, and are employing more men than at any time since the hectic World War days.

Beef Imports: The first chilled beef shipped from Australia to Japan arrived at Yokohama recently from Brisbane. The trading company in Yokohama which received the consignment pioneered in the importation of frozen beef into Japan approximately twenty years ago, and is now endeavoring to introduce chilled beef from Australia. The Japanese steamship line interested in the traffic has placed two new steamers on its Australian run which are equipped to carry chilled beef. Prospects for the development of the new business are very good.

Business Improvement: Sentiment in the financial and the business communities of Japan improved substantially following the formation of the new Cabinet, and while it is believed locally that some currency inflation and higher commodity prices are inevitable, only moderate changes in the general monetary and economic situation are anticipated. Anxiety is still evident regarding the attitude of the Diet on certain administrative measures, especially the 1937-38 budget and the tax increase and reform plan. Trade reports indicate that the Ministry of Commerce has tentatively decided to limit the importation of raw cotton in 1937 to 14,000,000 piculs (1,851,920,000 pounds), or 10 per cent less than the amount which buyers had planned to purchase. This amount of cotton, together with stocks on hand at the end of 1936, will be barely sufficient to cover the absolute needs for 1937.

Indian Pig: Japan will continue to absorb a large proportion of India's pig iron output. During the first ten months of 1936 India's exports of pig iron to Japan totaled 325,000 tons. Japanese steel interests were in India recently endeavoring to negotiate for the purchase of 1,000,000 tons of pig iron during the current year. India's pig iron production in the January-October period of 1936 totaled 1,168,102 tons, of which domestic consumption absorbed 660,000 tons.

Rayon Production: Japan will rank as one of the world's largest producers of rayon in 1937. Final statistics for 1936 show that aggregate production of rayon yarn in that year totaled 260,865,000 pounds, compared with 201,031,570 pounds in 1935 and 137,795,190 pounds in 1934. Japanese output in the calendar year 1936 was apparently below that of the United States, but her rate of increase over the preceding year was substantially higher.Exports of rayon yarn during 1936 amounted to 44,337,100 pounds, against 30,427,900 pounds in 1935, while exports of rayon cloth totaled 527,941,932 square yards, against 424,160,972 square yards. British India and Kwantung Leased Territory were the outstanding markets for both items.

Despite strict curtailment measures and record output figures month after month, Japanese rayon yarn producers continue with new installations of spindles. While the exact number of spindle installations is not available, it is estimated that 200,000 spindles were installed in the last six weeks of 1936.

The Japan Rayon Association announced that the present curtailment rate of 35 per cent for plants with more than 12,000 spindles and 32.5 per cent for those with less than this amount would remain unchanged for the first quarter of 1937.

● China Looking Up.

Silk Market: Improved conditions in the Canton, China, silk market obtaining in the latter part of 1936 continued into 1937. Prices fluctuated rather widely during January, but they were higher at the close than at the beginning. Europe displayed no interest, but early in the month the demand from India produced rising prices. The Hong Kong dollar (currency in which raw silk prices are quoted) continued steady through the month.

Exports of waste silk from Canton were considerably greater during January than during the preceding month, the totals being 1,248 bales, as compared with 810 bales. Exports to the United States amounted to only 447 bales. Exports of raw silk decreased slightly, being made chiefly to Asiatic and European countries.

Commercial Aviation: Definite progress in commercial aviation was recorded in China in 1936, with available statistics showing an increase of approximately 100 per cent in air passenger and mail traffic compared with 1935. Existing air transport lines were extended during the year, new and better equipment was placed in use, and the general population was noticeably more air-minded.

The greatest achievement during 1936 was the suc-

cessful termination of negotiations between the China National Aviation Corporation and the Hong Kong Government, whereby the former was granted loading privileges at Hong Kong, thereby making practical its tie-up with the American transpacific Air Service.

A Canton-Hanoi line to connect with Air France was inaugurated during the year, thereby establishing a Shanghai-Europe service via Canton and Hanoi. A further development of some significance was the establishment of a regular air service between Dairen, Tientsin, and Peiping.

Ginseng Imports: Exports of American ginseng, the most important crude drug exported from the United States, and one for which there is an unfailing demand in China, shattered all previous records last year.

A total of 295,000 pounds of dried ginseng roots, valued at $1,236,000, were exported from the United States during 1936, against 167,000 pounds, valued at $618,000, in the preceding year. Almost the entire amount during both years went to the Chinese market, as it has been since the beginning of the American industry. During the past 15 years China has purchased approximately three million pounds of American ginseng, valued at about $25,000,000.

In the United States ginseng is used but sparingly, even by Orientals resident here, but for centuries the Chinese have regarded ginseng highly as a medicine, to be used when all other curative agents have failed.

The idea held in the United States that any genuine ginseng can be readily sold in China at a huge profit is fallacious. In order to yield even a small margin of profit, this trade requires more skillful and delicate handling than trade in almost any other article of commerce. Commercial buyers of ginseng are extremely rigid in their demands, and it is a matter of utmost difficulty to supply specimens filling all requirements.

● Philippine Foreign Trade.

Trade Improving: The foreign trade of the Philippine Islands registered substantial improvement in 1936 compared with the preceding year.

Exports were valued at 272,900,000 pesos ($136,450,000), an increase of 45 per cent over 1935, and imports amounted to 202,250,000 pesos ($101,125,000), an advance of 18 per cent. The year's favorable balance of trade amounted to 70,650,000 pesos ($35,325,000), compared with 17,443,000 pesos ($8,721,500) at the close of 1935. If gold shipments are added the balance is materially increased. Exports of gold in 1936 amounted to approximately 44,000,000 pesos ($22,000,000), compared with 32,349,000 pesos ($16,174,500) in 1935.

Exports to the United States from the Philippine Islands in 1936 valued at 216,100,000 pesos ($108,050,000), increased in practically the same ratio as did total exports, or about 44 per cent, and accounted for 79 per cent of the total export trade. Exports from the United States to the Philippine Islands in 1936 were valued at 125,700,000 pesos ($62,850,000), or 61 per cent of the total import trade, compared with 108,733,000 pesos ($54,366,500) and 64 per cent of the total in 1935.

Import trade with European countries amounted to 23,600,000 pesos ($11,800,000), an increase of approximately 35 per cent. Total imports from the Orient were valued at 51,400,000 pesos ($25,700,000), with imports from Japan amounting to 28,500,000 pesos ($14,250,000), compared with 24,343,000 pesos ($12,171,500) in 1935. Japanese imports accounted for 13 per cent of the total import trade, compared with 14 per cent the preceding year.

Philippine exports to Europe increased about 65 per cent in value, totaling 30,100,000 pesos ($15,050,000), while exports to the Orient amounted to 22,700,000 pesos ($11,350,000), or 45 per cent higher than in 1935. Of the latter shipments, exports to Japan were valued at 16,800,000 pesos ($8,400,000), an increase of 56 per cent.

● Australian Outlook Promising.

General Survey: Business prospects in Australia for 1937 are considered to be the most auspicious for any year since 1928. Retail trade and bank clearings in 1936 were approximately 6 per cent above 1935 levels. Iron and steel production of one large company was 15 per cent larger last year than in 1935. The general level of unemployment in December was about the same as the 1929 average.

Export prospects are considered to be especially good. The index for this trade in December was recorded at 943, compared with 866 for the week ended November 7. Exports for the first five months of the fiscal year 1936-37 (begun July 1) showed a gain of 8 per cent over those for the corresponding period of 1935-36, while imports showed a comparable gain of 10 per cent.

Bank deposits for the fourth quarter of 1936 showed a gain of £A2,000,000 (approximately $8,000,000), as compared with the same period of 1935; business advances were up by £A7,000,000 ($28,000,000) by the same comparison. Interest rates continue firm. It is expected, however, that favorable returns from exports will ease the financial situation somewhat.

The United States is buying Australian raw materials and wool more freely, and American export and import trade with Australia, excluding gold, is expected to about balance for the first half of the fiscal year 1936-37.

Wheat Production Down: Official estimates for wheat production in Australia during the 1936-37 season indicate an appreciable decline compared with the average annual production during the last ten years.

The final forecast for the wheat harvest in the current season is 134,182,000 bushels, a decline of 8,400,000 bushels, or 1 per cent, compared with 1935-36, and 29,500,000 bushels, or 18 per cent, under the average production for the ten seasons ended 1935-36.

The area under wheat throughout Australia is estimated at 12,609,000 acres for the 1936-37 season, an increase of 684,000 acres, or 5.7 per cent compared with the preceding season.

Short-Wave Station Planned: The Government of Australia is considering the erection of a high-power short-wave radio broadcasting station capable of disseminating throughout the world an Australian official news service.

Portland Port Notes

● **Pacific-Atlantic Officers.**

S. P. Fleming, treasurer of the Pacific-Atlantic Steamship Company since 1931, was elected president of the company by the board of directors at its June meeting in Portland. At the same time Peter Kerr, president of Kerr, Gifford & Company, a leading shipper of grain, flour and feeds, was elected to the board; A. R. Lintner, Northwest manager, was promoted to Pacific Coast manager; and Kenneth Robertson, assistant to Fleming, was elected secretary-treasurer.

Fleming succeeeded Kenneth D. Dawson, who left the company to become Pacific Coast manager of Panama Pacific Line.

Present for the meeting were: John E. Cushing, vice-president of the American-Hawaiian Steamship Company, and Ernest L. McCormick, president of Williams, Dimond & Company, both of San Francisco; R. A. Nicol and Ernest L. Nye, both of New York; H. B. Van Duzer, Charles E. Dant, Ralph Williams, and Mr. Fleming, all of Portland. Dawson and Sexton, both of whom retained their status as directors, were not present.

The directors voiced assurance to their clientele that the Pacific-Atlantic Steamship Company, which owns and operates the Quaker Line fleet of 13 intercoastal steamers, would continue its past service.

Mr. Lintner, the new Pacific Coast manager, was Northwest manager for the United States Shipping Board for two years and general agent of the States Steamship Company at Kobe, Japan, for six years, before becoming Northwest manager for Quaker Line at Seattle 2½ years ago.

● **Army Engineers Promoted.**

Captain Samuel L. Damon, assistant to the district engineer of the 1st Portland District, United States Engineers, was promoted to district engineer, and Captain Colby M. Myers, resident engineer at Bonneville, was promoted to district engineer of the 2nd Portland District, according to announcements from Washington last month.

The two officials succeed Lieutenant-Colonel Milo P. Fox, transferred to Fort DuPont, Delaware, and Lieutenant-Colonel Charles F. Williams, transferred to Fort Leavenworth, Kansas, respectively.

Captain Damon is a native of Independence, Oregon, and a graduate of Oregon State College. He had served the Portland District as assistant to the district engineer since 1929, with the exception of two years when he was on duty as an engineering instructor for the R. O. T. C. at Washington State College.

Captain Myers has been connected with the construction of Bonneville Dam, under Lieutenant-Colonel Williams, for about four years.

● **Shipping Club Elects.**

A. M. (Sandy) Scott, export manager at Portland for the Pillsbury Flour Mills, was elected president of the Portland Shipping Club for its 1937-38 season at the club's annual summer golf tournament and election dinner. The new vice-president is Ed Valentine, of the Fireman's Fund Insurance Company; secretary is Carl Anderson, of Western Pacific Railway; and treasurer is E. E. (Jack) Shields, of Burchard & Fisken, Inc.

● **North Jetty Plans.**

Plans for rebuilding the north jetty of the Columbia River entrance are being completed by the 1st Portland District, United States Engineers, in contemplation of instructions from Washington to go ahead with the $2,000,000 project.

The jetty extends about 2½ miles toward sea from Cape Disappointment, and needs a new top of boulders. A feature of the reconstruction, as planned, will be a concrete terminal composed of 11 blocks of concrete anchored around one 1700-ton block at the end of the jetty, to break the action of the ocean and keep the rock from unraveling.

This terminal is quite different from the asphalt-

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Steamer Potmar completely loaded with lumber but tied to the dock by labor troubles.

Along Seattle Waterfront

● **Pier Fire**

On Thursday, June 10, the Connecticut Street dock was swept by a fire which did damage in excess of $100,000, despite the quick response of the Seattle fire department and the excellent work of the U. S. Navy tug Mahopas. This pier is headquarters for the Coast Guard, and considerable property belonging to that organization was destroyed by the fire.

Either defective wiring or carelessness with cigarettes seems to be the proximate cause of fire, judging from the initial press reports on an investigation started by the Coast Guard. The Board of Enquiry consists of: Captain G. W. David, Division Engineer; Lieut. G. P. McGowan, and Chief Boatswain Ernest Pointer, all Coast Guard officers.

● **Good Will Cruise**

Under the auspices of the Seattle Chamber of Commerce, a large party of Seattle businessmen made a good will trip to southwest Alaska early in June on the Aleutian, flagship of the Alaska Steamship Company. "This," said the chairman of the cruise, Thomas M. Pelley, "is the largest and most representative group of Seattle folk ever to make a good will business tour of Alaska."

● **First Alaska Steamer**

The steamship Victoria, of the Alaska Steamship Company, cleared Seattle June 2 for Nome, the first ship to carry passengers and cargo to that northern port since it was closed by ice last fall. Victoria was followed quickly by the steamers Tanana (June 3) for Nome, and the Derblay, a little later, for Kotzebue. During a three-week period ending June 12 the Alaska Steamship Company had 12 other sailings from Seattle for Alaska ports.

● **Steamship Man Takes to Air**

After serving 13 years in marine transportation, Harold Veith has resigned as Portland city passenger agent for the Dollar and American Mail Lines and has accepted an appointment to the Seattle traffic squad of the Northwest Airlines. During his connection with the steamship game Veith served as purser on various ships and then as passenger agent in various districts before coming to Portland. He is a reserve lieutenant in the Quartermaster Corps and a member of the American Legion, Edward B. Rhodes Post, Tacoma.

● **Alaska Supply Ship**

During the last week in May the steamer W. M. Tupper, of the Santa Anna S. S. Company, sailed for Bethel with a full list of passengers and her annual cargo of supplies for the Kuskokwim. At Bethel this cargo will be turned over to the Alaska Rivers Navigation Company, a subsidiary, which is under the management of Frank Mortimer, and which will distribute the supplies throughout the mining camps and trading posts of the district. This cargo contained every requisite for life on the frontier, from foodstuffs and clothing to ammunition, and from gasoline to steel traps and prefabricated houses.

● **Northland Fleet Busy**

Every vessel owned by the Northland Transportation Company will have been pressed into service by the middle of July to meet the insistent demand for tonnage caused by the heavy cargo movement of cargo to and from Alaska.

● **Port Board Election**

The Board of Port Commissioners held its annual meeting June 7 and elected: **Smith M. Wilson** to be their president; **Horace P. Chapman** as their vice president; and **Jack A. Earley** as their secretary.

The new president is beginning the third year of his second term as port commissioner and is a past president of the Pacific Association of Port Authorities. In his acceptance speech he said:

"There is every indication that the conditions and factors which for some years have retarded maritime trade in this and other ports are now definitely behind us. Port business and port finances can be said now to be entering a stage of healthy improvement. Every effort will be extended by the administration to make a record of progress during the new fiscal year."

● **Port Personals**

Lester M. Caldwell, assistant vice president Fireman's Fund and Occidental Indemnity companies, was in Seattle recently on a business trip from San Francisco.

William D. (Bill) Sells, of the McCormick Steamship Company operating staff at this port, was in the Swedish hospital for repairs, and on June 10 his "for'ard hatch was opened" and some damaged cargo removed. The patient is doing as well as can be expected; in fact, it is a "general average" case.

Word comes from **John Allsop** that he had a fine view of the coronation parade from the windows of the London offices of the Royal Mail Lines Ltd. Allsop is the Pacific Northwest representative of the Royal Mail and the Holland America Lines, and is at present on an extended trip to Europe. He will return in August.

K. Simundsen, a Seattle youth, is one of the six Capital prize winners in the nationwide poster contest of the Propeller Club of the United States. His prize will be a round trip between Seattle and the Panama Canal. Other awards to Seattle young people in this contest were: **Shellar Watson**, a $10.00 prize; and **Suzanne Hoag, Lloyd Lamb, R. H. Powell,** and **Gladys Warlick**, $5.00 prizes.

In the nationwide essay contest: **Adelbert Preiser**, of Seattle, rated in the Capital Awards and won a free trip from Seattle to the Panama Canal and return; **Kathleen Binet** and **Margie Weaver** won $10.00 cash prizes; and **Herb Danz** won a $5.00 cash prize.

. . . . In and About

Los Angeles Harbor

● Los Angelean High Bidder.

John E. Brennan and Associates of Los Angeles were high bidders on the American Pioneer Line when the bids were opened for chartering of steamship lines owned by the U.S. Maritime Commission. The Pioneer Line uses 12 motorships with a total deadweight tonnage capacity of 109,389 tons, or an average of 9115 tons. These ships are used in three services: Indian, using five vessels from U.S. Atlantic and Gulf Ports via Suez Canal to ports in Red Sea, India, Ceylon in Karachi-Calcutta Range; Australian, using four vessels, Atlantic and Gulf Ports via Panama Canal, to ports in Australia, New Zealand and Tasmania; and Far East, using three vessels, Atlantic ports via Panama Canal to Hawaii, Philippine Islands, China, and Japan.

The vessels are all Shipping Board Emergency Fleet Corporation cargo carriers, with hulls 18 years old, built originally as oil burning steamers and converted into motorships in 1927 and 1929, at which time the hulls were thoroughly overhauled and new electric cargo winches and other auxiliaries installed. They have a sea speed of about 13 knots and a cruising radius of from 20 to 30 thousand miles.

The Pioneer Line is at present operated by the Roosevelt Steamship Company of New York, which is a subsidiary of the International Mercantile Marine. The bid of this firm was $0.25 per deadweight ton per month, making an annual total of $328,167. The bid of Brennan and Associates was $0.275 per deadweight ton per month, or an annual total of $360,983. John E. Brennan left for the Atlantic Coast on hearing that he was high bidder, and is now in Washington conferring with the Maritime Commission and with his assocates.

● Oil Shipments.

Bulk petroleum shipments by sea during week ending June 12 totaled 1,103,096 barrels, a decrease of 450,000 barrels compared to the previous week. There were no shipments through Panama Canal during that week. Pacific Coast domestic ports took 731,100 barrels and the balance went to Pacific Ocean foreign ports.

● American Fisher Explosion.

The fish reduction steamer American Fisher, while in use as a coastwise tanker, was badly damaged by an explosion late in May off the Southern California coast. Brought into Los Angeles harbor for survey, she was freed of gas and thoroughly examined. Surveyors estimate that repairs will take approximately a month and cost about $100,000. A large part of her midship section is affected.

Loading oil at Los Angeles Harbor through Chiksan rotary all metal hose.

● Relocating Harbor Beacon.

Army engineers are working to make Los Angeles harbor a safe port to enter or clear in thick weather. Construction is under way of a new dolphin for San Pedro entrance light No. 2. This beacon will be moved 215 yards NNW from its present site. This change has been made possible through the removal of a large portion of the shoals south of Reservation Point. It will enable vessels to come in or go out with a much straighter course than is now possible.

An electric fog siren has been established on the outer end of Belmont Pier at the easterly limits of Long Beach.

● Maritime Exchange.

July 1 marked the fourteenth year since the organization of the Marine Exchange of the Los Angeles Chamber of Commerce, and the tenth year since Captain Paul Chandler took charge. Lieutenant E. N. Varnardo, U.S.N., Retired, has been assistant manager and in charge of the lookout station at the harbor during the entire period. This exchange, expanding rapidly from a very humble beginning, is today recognized as among the best in the country.

The Path to Sheet Metal Permanence. A very handsome and interesting 24 page illustrated book very recently issued by the Republic Steel Corporation. Copies are available from any of the Pacific Coast offices of this company, located at Los Angeles, Seattle, and San Francisco.

The text is mainly devoted to a serious consideration of corrosion in the various industries, and how the use of Toncan (copper, molybdenum) Iron overcomes this deadly enemy of metal structures.

Observations on Fire at Sea

By H. L. Seward
Professor of Mechanical and Marine Engineering,
Yale University, New Haven, Conn.

The Morro Castle Disaster

This article is taken from "Mechanical Engineering" of January, 1935, and was written by our good friend Professor Seward shortly after the preliminary official inquiry into the Morro Castle fire. On the very timely subject "Safety At Sea," it reflects the judgment of a keen mind tempered by long experience in operating and teaching problems. It is of especial interest just now, as Professor Seward is a member of the Technical Committee, on whose report the pending Safety at Sea Bill, S. 1916, was based.

Professor Seward is very prominently mentioned in Washington circles for appointment as Director of the Bureau of Marine Inspection and Navigation, to succeed Joseph B. Weaver, resigned. It is our judgment that he is the type and has the training and experience necessary to make a good record in this very difficult and important position.

From every major marine disaster an important lesson has been learned, but never have there been such obvious lessons as appear to one studying the testimony given in connection with the Morro Castle. The Titanic taught us lessons in watertight subdivision and the dangers of longitudinal bulkheads. The Vestris pointed the way to control of metacentric heights and loading. The Morro Castle disaster adds emphasis to the known hazards of fire due to the presence of so much kindling wood, inflammable finish, and decorations.

● **Fire-Resisting Construction.**

The L'Antique, the Phillipor, the Volturno, and other ships burned at sea. Every one knows that fire is one of the great hazards, not only at sea, but also in the air and ashore. When the Morro Castle was built four years ago, specially treated fire-resisting materials were just beginning to become commercially available for use in passenger spaces on ships. At present enough fire-resisting materials are commercially available so that, with the more extensive use of steel and other metals, the fireproof or fire-resisting construction of passenger and crew quarters is not only practicable but economical. The added cost of such fire-resisting construction is not more than two per cent of the total cost of the vessel. Wood and other inflammable materials have already been practically eliminated, on modern vessels, from crew's quarters, galleys, pantries, and on the lower decks, so that, except in passenger accommodations, the fire hazard has been greatly reduced.

On the newest American ships, practically all bulkheads in the passenger spaces are made of fire-resisting materials. In the past, where a passenger vessel has been destroyed by fire, the fire has swept through passenger accommodations with incredible speed. In new ships such possibilities should not exist. A ship should not be built like a palace or a museum; it is a transportation unit and should be designed as such. The atmosphere of luxury, if necessary, should be confined to furnishings of good taste. As background, the ship's structure will be much more successful (assuming an harmonious design) if the passenger has the sense of security which comes from the knowledge that it cannot burst into flame.

● **Safety on the Morro Castle.**

The Morro Castle was built to conform in every

respect as to subdivision, strength, stability, seaworthiness, and equipment with the Board of Trade Rules for 1928, and although laid down prior to the International Convention on Safety of Life at Sea of 1929, was built in substantial accord with the requirements of that convention. The plans and specifications were approved by the American Bureau of Shipping, the United States Shipping Board, the Steamboat Inspection Service, the Navy Department, and, in so far as the electrical installation was concerned, by the National Board of Fire Underwriters.

Cargo holds were fitted with a smoke-detection system with indicators on the bridge and a foam extinguishing system controlled from the same point. The boiler room was fitted with a foam extinguishing system. Staterooms were equipped with thermostatic detectors operating on any rapid rise in temperature such as might be caused by a fire, no matter how small, in a confined space, with indicators on the bridge. The foam extinguishing system is not practicable for staterooms, for the reason that foam smothering a fire in one room might also smother the occupants of staterooms on the same branch of the system. Nor has it been considered practicable to equip ships with automatic sprinkler systems similar to those used in buildings ashore, although a very few vessels are thus fitted.

As in the case of practically every passenger ship, the public rooms of the Morro Castle were not provided with automatic detectors, the discovery of fire depending upon the frequent inspection by watchmen, and its extinction, as in staterooms, being accomplished by hand extinguishers and hose. Fire-screen bulkheads, capable of withstanding a temperature of 1500 F for one hour, extended all the way up through the superstructure, spaced no more than 131 feet apart—usually less, in accordance with partitioning between public rooms—and were fitted with fire-screen doors possessing equal fire-resisting qualities.

● The Problem of Personnel.

As the story of the Morro Castle fire is unfolded in the press, in the testimony of survivors of the disaster, and in the official reports, it becomes evident that more is needed to insure safety of life and property than fire-resisting materials and fire-detecting, fire-protecting, and fire-fighting devices. In the development of these the engineer may take a reasonable pride of accomplishment, for in them he has incorporated the lessons of experience and the advances in technology and science. It is evident that, in the last analysis, competent, alert officers and men are even more necessary in emergencies on modern ships than on smaller and more simple craft, and that in the safety devices themselves are those additional hazards that come from a sense of overconfidence and over-security and the uselessness of the devices themselves if they are not properly maintained and operated, or if their functions and operation are not understood. Important as the lessons concerning inflammable materials of construction certainly are, therefore, they are eclipsed by thoughts in connection with the lack of training and discipline of the crew of a ship in dealing with an emergency. As in industrial undertakings, it becomes more and more evident that an engineering job is incomplete without constant attention to the problems originating in the personnel and their relation to machinery and mechanical devices, not only in operation, but in maintenance and design as well. The dictum that a machine is not properly designed until it has been made as safe and as foolproof as conditions and the state of technology permit, is particularly valid with respect to ships where hazards and emergencies are grave and are met with overwhelming suddenness.

Ship operators, like other business men, are in business to make money if possible, and must see a fair return on every investment. Successful operation of all equipment depends on trained personnel, especially on a ship with its many complicated functions and devices. Resourceful seamen with that inquiring turn of mind who can reason from effect to cause and devise a remedy when occasion arises will always be needed. Every officer and man on a ship should be both a teacher and a student, a teacher to those below him and a student to those above him. There should be no further place for that type of officer who resents questions, refuses to explain things, and discourages an ambitious learner. Due to the introduction of so much mechanization in industry there is a natural tendency to dull the mental activities of attendants. This is especially true aboard ships where life is quite routine with its watch-standing and tendency toward monoton-

ous existence, much of the time. While we like to make our occupations more comfortable and every man-hour more effective, we must give as much thought to the human side of the situation as we have to the creative design. How shall we make the life of a sailor attractive to the very best type of young men? How much longer must the cadet act, look, and be thought of aboard ship as a "lost soul"? How shall we stimulate and develop these young men into the best possible operatives af these complicated devices on which we send them to sea? We shall achieve our goal of safe and economical marine transportation only after we have succeeded in answering questions such as these.

Fighting Fire At Sea.

To fight fire at sea with any degree of success requires the services of competent men who by constant training, drilling, and actual practise are able to snap into action with military precision and execute orders with no loss of time. Proficiency in this vital work cannot be obtained without executing every detail of it again and again under every sort of condition that is likely to be met on the ship.

The regulations of the National Fire Protection Association governing marine fire hazards contain a valuable recommendation regarding this matter that should be carefully considered by shipowners, and that is that certain members of the crew be designated as fire wardens and trained to special duties, such as the use of smoke helmets and fire-extinguishing apparatus, life saving, etc., and that some form of compensation or privilege be accorded the men so designated. French passenger vessels carrying more than 250 passengers are required to carry a squad of fire specialists, holding a special certificate, under the orders of a security officer, the number varying from three to nine, depending upon the capacity of the passenger accommodations.

If we have found that some officers and men have proved themselves less than capable, may we not remember those fine heroes yet active and alert in the American merchant marine, such as Randall, Grenig, Stedman, Fish, Fried, Miller, Cummings, Moore, and others who by superb seamanship and organization have not only performed splendid rescues of lives at sea but have kept their own ships safe and secure in the service of transporting passengers and freight?

Ferrokote Enamel

Actual experience on marine structures, underground pipe lines, and other steel surfaces where corrosion is known to be severe, has shown that coal tar pitch enamels have given the most permanent protection. The tendency to become brittle and crack in cold weather and to soften and run under summer heat limited the field of this otherwise excellent protective coating.

Ferrokote Enamel, a solid material applied hot, is compounded from selected refined coal tar pitches and mineral fillers. By a new manufacturing process the deficiencies of the older type enamels, brittleness and narrow temperature ranges, have been eliminated. It is recommended as a permanent protective coating on surfaces where the usual steel protective paints fail. Specifications will be furnished for the use of this coating on ships, marine structures, lock gates, steel piers, bridges, viaducts, flumes, fresh and saltwater tanks, filters, pipe lines, penstocks, acid plants, and other structures where its use is recommended.

The S. J. Porter Company, who have been engaged in the sale and application of bituminous coatings for the past twenty years, are equipped to apply the Ferrokote Solutions and Enamels on all types of marine work.

Merchant Marine Officers' Licenses

Name and Grade	Class	Condition
ALASKA		
Bern Anderson, Master	OSS & OMS, any G.T.	O
First Class Pilot	OSS & OMS, any GT SE & SW Alaska	
Roy F. Roach, Asst. Eng.	OMS, any GT	RG
PORTLAND		
Guy W. Shepperd, Chief Eng.	OMS, any GT	RG
Robert P. Shelden, Chief Eng.	OSS, 750 GT	O
2nd Asst. Eng.	OSS, any Gt	
Arthur F. Arnold, 1st Asst. Eng.	OSS, any GT	RG
Rudolf L. A. Mook, 2nd Mate	OSS, any GT	O
SAN PEDRO		
Henry J. Hassett, Chief Mate	OSS, any GT	RG
Adolf F. F. Bolter, 2nd Mate	OSS, any GT	O
Kenneth H. Busch, 2nd Mate	OSS, any GT	RG
Elias S. Dahl, 2nd Mate	OSS, any GT	O
Stanley E. Jorgensen, 3d Mate	OSS, any GT	O
Charles M. Perkins, 3rd Mate	OSS, any GT	O
Francis M. Clark, Chief Eng.	OMS, 750 GT	O
Gordon Pecor, Chief Eng.	OMS, 750 GT	O
Don W. Mortensen, 2nd Asst. Eng.	OMS, any GT	O
Clinton S. White, 3rd Asst. Eng.	OMS, any GT	RG
SAN FRANCISCO		
Oscar C. Thomsen, Master & Pilot	OSS, any GT	RG
Lionel H. de Santy, Master & Pilot	OSS, any GT	RG
Jacobus Lems, Chief Mate	OSS, any GT	RG
Christian S. Aasted, Chief Mate	OSS, any GT	RG
Joseph C. Piplone, Chief Mate & Pilot	OSS, any GT	RG
Elmer R. Eastman, 2nd Mate	OSS, any GT	RG
Perry McPheeters, 2nd Mate	OSS, any GT	RG
Edward H. Dovey, 2nd Mate	OSS, any GT	RG
Allan McLean Kay, 3rd Mate	OSS, any GT	O
Edward W. Towne, Chief Eng.	OSS, any GT	RG
Robert L. Gray, Chief Eng.	OSS, any GT	RG
John O. McDonald, Chief Eng.	OSS, any GT	RG
John G. O'Connor, 1st Asst. Eng.	OSS, any GT	RG
Ferres T. Norgard, 2nd Asst. Eng.	OSS, any GT	O
Eugene M. Thompson, 2nd Asst. Eng.	OSS, any GT	O
Leo T. Hannon, 2nd Asst. Eng.	OSS, any GT	RG
Sylvester James Mirtich, 3rd Asst. Eng.	OSS, any GT	O
Alf E. Larsen, 3d Asst. Eng.	OSS, any GT	O
Lyal E. McNamire, 3d Asst. Eng.	OSS, any GT	O
Charles Edward Luddy, 3d Asst. Eng.	OSS, any GT	O
Elton R. Lipp, 3d Asst. Eng.	OSS, any GT	O
Frank Harold Shimek, 3d Asst. Eng.	OSS, any GT	O
William M. Herren, Chief Eng.	OMS, any GT	O
John Elmer Hartnett, Chief Eng.	OMS, any GT	O
SEATTLE		
George M. Tuttle, Jr., 3d Mate	OSS, any GT	O
Joseph Johnson, 1st Asst. Eng.	OMS, any GT	O
Oskar Johansen, 2nd Asst. Eng.	OSS, any GT	RG

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

On the Ways — SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

The Motorship in the American Merchant Marine

On page 28 of this issue is an article describing the present trends in marine diesel engines, which shows that great improvements have been made in that prime mover during the past decade, and that some of these improvements have been due to the initiative and the research ability of American manufacturers. The present world's merchant fleets in vessels of 100 gross tons and over contains 64 million gross tons, of which 66 per cent are driven by reciprocating steam engines, 20 per cent by diesel engines, and 9 per cent by steam turbines. The American merchant marine fleet of steel vessels contains 12,000,000 gross tons, of which some 800,000 gross tons, or 7½ per cent, are driven by diesel engines.

Looking at the status of the diesel engine in this broad general way, we find ourselves to lag very considerably behind the rest of the merchant marine world in the application of the diesel engine to marine propulsion. This lag is due to a number of causes which need not be discussed here.

We are now very evidently about to start a merchant shipbuilding program, and we are faced with the problem of assigning to the diesel engine its rightful place in that program. We have diesel engine builders who have demonstrated their ability to produce reliable prime movers in the stationary, the locomotive, and the marine types, and certainly the marine diesel has demonstrated on board ship its great ability to save fuel.

The ship and its power plant should be designed as a working unit. Our naval architects and marine engineers need to get together in designing such a unit so that the completed whole will produce the best record for ton-mile costs under the conditions prevailing on the proposed trade route.

This type of design work would take into consideration not only propulsion at sea but also working the ship in port, measurement of the ship for port and canal dues, and safety and comfort of the operating personnel, the cargo, and the passengers under all conditions to be met in the trade.

While our experience with large seagoing motorships is limited, we do have a few modern diesel engined ships in various services, whose records for economy are an open book, and we can get reliable information from the operators of many foreign motorships operating on practically every sea trade lane.

We are not advocating a wholesale diesel motorship program. We are advocating a serious study of diesel motorship possibilities. We think that such study will result in the adoption of diesel motorships for certain essential trade routes.

Shipbuilding Notes

Philippine Merchant Marine

The National Development Company of the Philippines is planning the organization of a national merchant marine for the Philippine Islands. Plans include the building of two cargo vessels for the Pacific service and two for the European service. These ships will average about 10,000 tons deadweight carrying capacity, and the approximate cost is estimated at 20,000,000 pesos, or $10,000,000, for the four ships. If not found too costly, two of the ships will be equipped for passenger service.

Ship Sales Tax Off

The best news of the month for California shipyards is the signing by Governor Merriam of the bill releasing ships of 1000 tons gross or over from payment of the 3 per cent California State sales tax. Together with the already established 6 per cent differential on bids for all new construction in naval vessels or on Pacific Coast commercial vessels using federal subsidy, this measure will put all California shipbuilders in a position of equality with Atlantic Coast yards in competitive bidding on new vessels within their capacity.

Already the California yards are getting ready for new work and all interested parties are looking forward eagerly to the inauguration of the Maritime Commission program of shipbuilding.

(Page 52 please)

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401)**; completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, [illegible]; depth, 19' 8". Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; completion date July 24, 1937.

DRYDOCK AND ROUTINE REPAIRS: **President Lincoln, Cadaretta, Hanley, Manukai, Chiriqui, Richmond, President Coolidge, Steam Sch. Celilo, Portmar, District of Columbia, U. S. Dredge A. Mackenzie, Fireboat Dennis T. Sullivan, M.S. Richlube, M.S. Redline, Fr. Str. Calistoga, Santa Rosa, W. S. Rheem, Talamanca, President Wilson, Nor. S.S. Skrim, Mana, El Segundo, Charcas, President Taft, Condor, Maunlani, Penmar, M.S. Canada, Antigua, Monterey, Tug W. B. Storey, D. G. Scofield, M.S. Hawaiian Standard, President Hoover, Washington, State Dredge No. 4, El Capitan, West Cape, M.S. Adelfen, W. F. Burdell, R. J. Hanna, Dredge Tualatin, Santa Paula, Waiotapu, Lurline, Point Ancha, Baldhill, Capac, Manoa.**

FELLOWS AND STEWART, INC.
Wilmington, Calif.

NEW CONSTRUCTION:

One 40' sport fishing boat, twin screw, Kermath gas engines. Estimated delivery date August 1, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Yachts Avatar, Los Cerritos, Katinka, Rainbow, Winsome; 48 smaller yachts.**

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Miscellaneous repairs and drydockings.

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats**; 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; estimated launching, 2 in July; 2 in August, 1937; expected completion, August to October, 1937.

Two 78'x20'x9'6" Lamparo fishing boats; one for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; second for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. Delivery date September, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: **Birmingham City, President Garfield, President Wilson, Nizina.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

NEW CONSTRUCTION: **120' steel tuna vessel**; 600 H.P. Enterprise diesel engine; delivery date September 15, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Lighthouse Tender Cedar.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Emidio, S. O. Barge No. 7, Catalina, Utacarbon, Eureka, Yacht Happy Days, Bahrein, Yacht Haida, Yacht Enchantress, W. O. Barge No. 1.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Hawaiian, Golden Star, Ernest H. Meyer, Herms, Fishboat Sea Star, Maunalei, Axel Johnson, Glacier, Frances, Water Barge No. 30, Patterson, Golden Cross, Despatch No. 3, Siantar, Varanger, Delta Standard, California, Point Reyes, H. T. Harper, Lake Frances, Sidney Hauptman, Willmoto, Multonomah, Dorothy Wintermote, Dredge McMullen, K. R. Kingsbury, Santa Fe Barge No. 5, Marian Otis Chandler, Tug Hercules, Maliko, Paul Shoup, Associates, American Star, Kentuckian, J. A. Moffitt, Canada, Burma, Billie Louise, Golden Horn, Brunswick, Admiral Goves, Montanan, Oregonian, Columbian, San Anselmo, Tanker Dorn.**

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: **C.G.S. Birnie; 7 scows; 13 fish boats; 31 ship repair jobs not requiring docking; 41 commercial jobs.**

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; estimated completion date, November 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Cushing, Perkins, Oklahoma, Arizona, Pennsylvania, Tatnuck.**

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Stephens 36, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched March 22, 1937.

Alicita, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched April 4, 1937. Owner, J. V. Carson, Hollywood.

Dalida II, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched April 11, 1937. Owner, D. A. Lord, San Francisco.

Irma Lou II, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched May 26, 1937. Owner, Louis C. Boone, San Francisco.

One 29' sport fishing cruiser (special) for J. C. Axelson, Los Angeles; powered by twin Lycomings "Six-85."

Nine standard stock 29's.

Six standard stock 36's.

Ruth K, 29' 2" x 9' x 2' 4"; powered by Gray "Six-51." Owner, Elmer Gumpert, Stockton. Launched April 17, 1937.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: M.S. Warrior, G. B. Petroleum II, Lewis Luckenbach, Cordova, Bering, Point Estero, M.S. Kalakala.

UNITED STATES NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley**, Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937.

Pompano, Submarine (SS181); keel laid January 14, 1936; launching date, March 11, 1937; estimated delivery, October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: Dahlgren, Overton, Lamberton, Boggs, Chicago, Ramapo, Koka, Vireo, Bobolink, Pinola, Medusa, Bridge, Narwhal, Cachalot, Cuttlefish, Angel Island.

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 126, purse seiner; 76′ x 20′; powered by Washington 200 H. P. engine. Keel laid May 1, 1937; launched June 15, 1937. Owner Peter San Felippi, Monterey.

Hull No. 127, purse seiner, 82′ x 20′; 200 H.P. Atlas engine; keel laid May 26, 1937. Owners, Ed. & J. Kaseroff and E. Manaka, of San Pedro, Calif.

Hulls Nos. 128 and 129, purse seine fishing boats; contracts let; deliveries in September and October, 1937.

DRYDOCK AND ROUTINE REPAIRS: Fishing Boats Oceania, Marymount, Success, Wisconsin, Luxor, Sea Pirate, Miridian, New Hampshire; Tacoma Fireboat No. 1; Tug Falcon.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION:

Six barges, 196′ x 34′ x 8′, for Barrett Line, Inc., Cincinnati, Ohio.

One oil barge, 145′ x 26′ x 7′ 4″ for Standard Oil Co. of Ohio.

One floating fender, 200′ x 7′ x 3½′, for National Tube Co.

DRYDOCK AND ROUTINE REPAIRS: 10 barges 175′x26′x11′; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Two bulk lake freighters** 610′ x 60′ x 32′ 6″; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis** and **DD396 Jouett; Three** 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 174, Tide, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, July 1, 1937.

Hull No. 175, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, September 1, 1937.

Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass, owners; estimated delivery, September 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; launched February 25, 1937; estimated delivery, August, 1937.

CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; estimated delivery February, 1938.

Annapolis, West Point, Yale; three diesel drive trawlers for General Sea Foods. Estimated delivery October, 1937.

Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil tankers**—steam—425′x64′x34′ for Gulf Oil Corp.; total tonnage 7070 each.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442′, beam 64′, depth 34′ 10″, gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

One barge for Socony-Vacuum Oil Co., Inc.; 260 feet long; non-propelled. Estimated delivery date October, 1937.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76′ all-welded diesel towboats** of 550 H. P. each, for private parties. Delivery date July 1, 1937 and August 1, 1937.

DRYDOCK AND ROUTINE REPAIRS: Adding 30′ midship in hull of diesel tanker Ellen Bushey. Reconditioning D/T Cherokee and D/T Walter C.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Two trawlers** for the Portland Trawling Company 146′6′x25′x14′2″.

DRYDOCK AND ROUTINE REPAIRS: Tug Hinton, Dredge Howell Dredge for Marine Cont. Co., Sprigg Carroll, Tug Lapwing, Tug Barrenfork Absaroka, Ferryboat Pelican, Marine Trade, Pilot Boat Street.

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

One 73′ cruiser, 2 Speedways; delivery date, July 1, 1937.

One 39′ play boat, 2 Buda diesels.

One 39′ play boat, 2 Chryslers.

Three 39′ play boats for stock.

One 42′ play boat for stock.

One 56′ cruiser, 2 Lathrops; delivery date, August 1, 1937.

One 57′ cruiser; delivery date September 15, 1937.

One 26′ runabout; delivery date July 1, 1937.

One 50′ cruiser, 2 MC Speedways; delivery date August 1, 1937.

One 42′ play boat, 2 Chrysler Royals delivery date August 1, 1937.

One 80′ diesel cruiser; delivery date autumn, 1937.

One 45′ cruiser; estimated delivery date September 1, 1937.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One lighthouse tender, Elm, 72′ 4″ x 17′ 0″ x 6′ 6″, for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

One diesel yacht, powered by 1,000 h.p. Winton engines; 143′ long, 23′ beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997** one diesel sternwheel towboat of 9[illegible] gross tons.

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100′x26′ x6′6″; 320 gross tons.

Hulls Nos. 1373-1374, inclusive; two welded flush deck cargo box barges 130′ x 34′ x 10′, for Warner Equipment Co., Philadelphia, Penn.; 90[illegible] gross tons.

Hulls Nos. 1377-1378, inclusive, and 1384; three welded steel deck barges

80' x 30' x 9', for Pennsylvania Railroad, Philadelphia, Penn.; 531 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hull 1387; one riveted steel coal barge 170' 3" x 40' 2" x 17', for Oliver Transportation Co., Philadelphia, Pa.; 1100 gross tons.

Hulls Nos. 1396, 1406, and 1408-1412, inclusive; seven welded steel coal barges 140' x 26 x 10', for Wheeling Steel Corp., Wheeling, West Va.; 2485 gross tons.

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Shipbuilding Company; 600 gross tons.

Hulls Nos. 1415-1424, inclusive; ten welded type W-3 coal barges 175' x 26' x 10' 8"; for stock; 4720 gross tons.

Hull No. 1425; one welded steel fuel flat 110' x 24' x 9'; for Union Barge Line Corp.; 200 gross tons.

Hull No. 1426; one welded steel fuel flat 80' x 18' x 6'; for Union Barge Line Corp.; 65 gross tons.

This makes a total of 32 hulls with a total gross tonnage of 11,246 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936; launching date August 25, 1937.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October, 1937.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937.

Hull No. 30, Saury (SS189); estimated keel laying date June 28, 1937.

Hull No. 31, Spearfish (SS190); estimated keel laying date September 9, 1937.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; keels laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, DD397 Benham, DD398 Ellet and DD399 Lang, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing; keel laid, Hull 143, Decemer 16, 1936; Hull 144, February 8, 1937.

Two destroyers, DD411 and DD412.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8'. Probable launching date September 21; delivery date, approximately Oct. 15.

One gold dredge, 120' x 65' x 9' 9"; duplicate of Dredge No. 4; 800 tons capacity. For South American Gold & Platinum Company, New York, N.Y. Delivery to be knocked down for export. **Delivered June, 1937.**

One steel vegetable oil barge for New York Tank Barge Co., N.Y.; 650 tons gross; capacity 1250 tons; 195 x 42 x 12. Estimated launching date September 1, 1937; estimated delivery date September 25, 1937.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all-welded steel diesel tugboat; 64' 11" long, beam molded 18', depth molded 7' 9"; equipped with 380 H.P. Atlas Imperial engine; for Pan American Refining Corp., New York City. **Delivery date, July, 1937.**

One all-welded steel diesel tugboat; 74' long, beam 19', depth 9'; equipped with 380 H.P. Atlas Imperial engine; for Higman Towing Co., Orange, Texas. **Delivery date, July, 1937.**

One all-welded work barge, 80' x 32' x 6', for D. M. Picton & Co., Port Arthur, Texas. **Delivery date July, 1937.**

DRYDOCK AND ROUTINE REPAIRS: Repairs and installation of new boilers for conversion from coal to fuel oil system.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank steamer,** 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,700,000 gallons of oil. Estimated launching date, August, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION:

One stern wheel all welded steam towboat, 190'x42'x7'6", for Standard Oil Co. of N. J., for service on lower Mississippi River; Foster-Wheeler water tube boilers; Marietta Mfg. Co. tandem compound engines of piston poppet type; H.P. cylinders 16" in diameter; L.P. cylinders 32" in diameter; common stroke of 10'. Keel laid December 9, 1936; launched May 3, 1937; **delivery date, July, 1937.**

Ten steel coal barges, 175' x 26' x 11'; for stock; **launching dates June and July, 1937.**

Three all welded steel oil barges 175' x 35' x 8' 6", for Standard Oil Co. of New Jersey; to be used for service on Ohio and Mississippi Rivers; delivery date August, 1937.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **Two steel carfloats,** 250' x 34' x 9'; for the Pennsylvania Railroad; **delivery date July 10, 1937.**

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935. No. 412, launched May 8, 1937.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359 aircraft carrier CV5, Yorktown,** for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6". Keels laid May 24, 1937.

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; **launching date, June 22, 1937;** delivery date, September, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively. Keel laid for first ship May 20, 1937.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

DRYDOCK AND ROUTINE REPAIRS: **Barge Roddand, Tug Hilton, Yacht Ohbee II, Tug Hamilton, Tug G & E No. 1, Tug Baldrock, Rob't E. Lee, Pilot Boat Wm. D. Sauver, Lighter No. 17.**

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, August, 1937; delivery date, September, 1937. No. 162, launching date, February, 1938; delivery date, February, 1938.

Hulls No. 163, 164, and 165, three diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launched June 5, 1937; delivery date August, 1937. No. 164, keel laid December 15, 1936; launching date, January, 1938; delivery date, February, 1938. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; delivery date, September, 1938.

Hull No. 170, one single screw steam tanker for Bernuth, Lembcke Co., Inc., New York; length 462' 4"; beam molded 65' 0"; depth molded 35' 0", DWT approximately 12,900 tons. Delivery date June, 1938.

TAMPA SHIPBUILDING & ENGINEERING CO.
P. O. Box 1838
Tampa, Fla.

DRYDOCK AND ROUTINE REPAIRS: **Cuba, Railroad Car Ferry Joseph R. Parrott, Yacht Alva, U. S. Hopper Dredge Absecon.**

TREADWELL CONSTRUCTION COMPANY
Midland and Erie, Pa.

NEW CONSTRUCTION:

1 derrick barge 100' x 44' x 6' for U. S. Engineer Office, Vicksburg, Miss.; delivery date, July, 1937.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, August 4, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively; estimated launching, May 7, June 3, and August 24, 1937, respectively; estimated delivery, August 19, September 9, and September 30, 1937, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 14, May 24, and June 17, 1937, respectively; estimated launching, August 17, September 28, and November 23, 1937, respectively; estimated delivery, September 24, November 24, 1937, and January 24, 1938.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6'. Keel laying date, June 10, 1937; launching date, July 20, 1937; estimated delivery, July 26, 1937.

CRANE PLANT
27th Street, Brooklyn, N.Y.

Hull No. 849, ferryboat John J. Walsh, for the Westchester Ferry Corp., Yonkers, N.Y. LOA 153', beam, extreme, 48', depth 14' 6". Estimated keel laying May 24, 1937; estimated launching, August 23, 1937; estimated delivery, September 12, 1937.

UNITED STATES NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; launching date February 1, 1938; estimated delivery indefinite.

Order placed for **DD415, O'Brien,** and **DD416, Walke,** two destroyers; delivery dates; August, 1939, and October, 1939, respectively.

UNITED STATES NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, Brooklyn, light cruiser, L.B. P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, Honolulu, light cruiser; L.B. P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935. Estimated launching indefinite; estimated delivery, May 1, 1938.

CL 50, Helena, light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

UNITED STATES NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for one harbor tug; LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'.

UNITED STATES NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404,** 1500 ton destroyer; no dates set.

UNITED STATES NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26' loaded draft 15'7"; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26' loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

SS192, Squalus, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

Shipbuilding Notes

(Continued from page 48)

McCormick to Build

The McCormick Steamship Company of San Francisco announced recently that it had closed with the U. S. Maritime Commission on a subsidy agreement for the balance of 1937. This agreement calls for a long range working plan for the construction of new tonnage to be submitted by the steamship company. This plan must include five or six ships, which should naturally come to Pacific Coast yards.

Mississippi Shipping Company Program

A tentative agreement between the Maritime Commission and the Mississippi Steamship Company, owners and operators of the Delta Line, calls for a replacement program of 10 years, involving nine new vessels. Work will be started early in 1938 on two 16 knot, 15,000 ton passenger and cargo vessels for their River Plate service.

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Captain Paulsen Mexico Bound

Capt. R. J. Paulsen, associated with the Pacific S. S. Company for thirty years and master of many famous West Coast ships, notably the Curacao, running to Mexico, sailed for Mexico aboard the Panama Pacific liner California recently.

Accompanying Captain Paulsen was Miss Claire Paulsen, his granddaughter, the daughter of Monroe Paulsen, president of Hercules Equipment & Rubber Company of San Francisco. Miss Paulsen has a host of friends in the Bay district who will anxiously await her return to hear of her tour.

Fred L. Doelker, Pacific Coast manager for Grace Line, recently announced the following appointments:

Thomas G. Reardon appointed foreign freight agent. He has been with the company for over 12 years.

R. E. Pyke to be general freight agent for San Francisco, in charge of the Johnson Line, for which Grace Line is agent.

Frank L. Hardy to be assistant foreign freight agent, and **Willis G. Daymond** district freight agent.

Mr. Jack Nuttall is the new proprietor of the McCaffrey Company of San Diego, well known for many years in Southern California as a distributor for marine products. Mr. Nuttall, himself, is well known in the marine field, for he is skipper of the trim little yacht "Loafer," which is a familiar sight in San Diego waters.

Among the popular marine lines handled by the McCaffrey Company is Tubbs Supercore and Tubbs Extra Superior Manila rope, the favorite for over eighty years of the marine and fishing industries.

First Passenger Liner to Pass Under Golden Gate Bridge

Photo courtesy Grace Line.

The Grace liner Santa Paula passing under the new Golden Gate Bridge—the first passenger liner to sail under the bridge after it was officially opened May 28. The Santa Paula left San Francisco at noon that day bound for Mexico, Guatemala, El Salvador, Panama, Colombia, Havana, and New York.

The Loafer, a familiar sight in San Diego waters.

Propeller Club of California
Briefs of the Month

During the vacation period while the membership seeks the mountain-tops, the trout-infested streams or (busman's holiday!) the sea-shore—the official "family" of the Propeller Club of California continues its activities in planning for the big Fall schedule.

The Entertainment Committee under the watchful eye of Chairman Bryant O'Connor is already surveying the course with the view of bringing before the luncheon meetings carefully created programs on pertinent maritime subjects.

The golf committee will soon break out the parallel rulers and charts and lay out a course for the big Fall tournament.

The Membership crew under Chairman Paul Faulkner is continuing the good work which has brought more than fifty new members into the ship's company this year. Latest to be hailed aboard are:

Captain R. M. Stall, of the S.S. W. S. Rheem.

Fred L. Doelker, Pacific Coast Manager of the Grace Line.

Reports of vacation journeys are coming in. **Dr. Arthur A. O'Neill** has returned from the Grand Canyon and his impressions of the riotous coloring of this natural masterpiece are well worth your ear.

George Swett saw a lot of scenery, met aplenty of fine friends, and managed to work in some interesting side trips on his recent business travels to the East Coast.

President Harms has his mind set on that ranch in the foot-hills and might get away later on when the press of business eases up.

Erik Krag, commuter extraordinary from Marvelous Marin (and, by the way, he's motoring over the new G.G. bridge daily) will golf, swim, and recreate at Rio Del Mar in the Santa Cruz country.

Stanley Allen, now a full fledged travelling man, is getting plenty of salt tanged air these days on his journeys to Morro Bay and way-ports.

Finished With Engines

Captain H. D. Clarke, past captain of General Petroleum, is retiring from active duty after a career rich with accomplishment. The Captain turns over the helm on July 1st. We hope to see him often at the Club meetings.

Vince Morabito's Boomerang Blow

"They might have laughed when I got up to play, but . . .," explained Ed Egbert.

Seems Vince Morabito, head of Martin Ship Service Company, did some playing himself and the tune hit some "blew" notes.

Vince organized two golf foursomes the other day to play down at Los Altos Country Club. The eight players were all sort of assembled at the third tee—Gene Essner, Arthur Forster, Captain John Rumsey, Frank Nicholson, Joe Klein, Ollie Langton, and Ed Egbert.

Prior to the golfing turnout Vince had gone shopping all over San Francisco to find one of the new-fangled devilishly contrived explosion golf balls, and the idea was to have Egbert's caddie tee up the dynamite ball for Ed when he wasn't looking.

With blue chips down and suddenly himself two down after the first couple of holes, friend Morabito was sort of disturbed and confused.

It was his turn to shoot,and he put down a glistening white pill and whaled into it with his famous specially weighted Martin driver!

The verdure clad terrain rocked; all hands fell on their sterns—Vince had walloped the carefully acquired explosion ball HIMSELF!

Howard Oxsen graphically illustrates the impact of Vince's boomerang blow on this page.

"They were still laughing when I got up to play," continued Ed. Egbert.

George Swett Surveys Eastern Outlook

George Swett, of George E. Swett & Co., engineers, of San Francisco, returned Monday, June 14, from a visit to various Eastern and Middle Western cities, where he conferred with principals regarding business conditions.

Mr Swett found their manufacturing plants taxed to capacity with work originating with the shipbuilding program on the East Cast, and fortunately free of labor troubles at this time.

He visited more than twelve different plants throughout the country, and states that in every case he found the men completely satisfied with working conditions and the management working in close cooperation in the endeavor to maintain harmony.

There is a feeling, however, that radical labor leadership, now manifesting itself in other basic industries, will upset what promises to be a profitable year for all concerned, but that ultimately the men themselves, in whose hands the matter rests, will return to the doctrines of good old Sam Gompers and shoulder the responsibility vested in all honest laboring men.

George visited his native state, Maine, over Decoration Day, and went fishing, but his alibi is that the water was too high and the black flies too thick to catch any fish. State of Maine liquor bites just as powerful as ever, he reports.

New Freight Service from California to Japan, Shanghai and North China

The "K" Line (Kawasaki Kisen Kaisha) will inaugurate a new direct monthly service from Los Angeles and San Francisco, effective with the sailing of the M.S. Eidsvold from Los Angeles, September 23rd, and from San Francisco, September 28th, followed with monthly intervals by the S.S. Nailsea Meadow, in October, and the M.S. Skagerak, in November. Ports of call will be Yokohama, Osaka, Kobe, Shanghai, Dairen and other North China ports, such as Tsingtau, Taku Bar and Chefoo. This new service to North China will be of particular interest to exporters as direct sailings for North China have lately been infrequent and irregular.

New San Francisco Factory for Xzit Pacific Company

This new "K" Line service is independent of their present services between the Orient and California, between the Orient and West Coast of South America, and between the Orient and New York, all of which vessels call in California ports eastbound and westbound.

The four new "Silk" express liners, between Japan, California, and New York, two of which have been completed and the other two entering service this fall, in addition to their westbound calls at Los Angeles may include San Francisco on their voyage to Japan and Shanghai, giving the record transit time for freighters from California to Japan of only 13 days, and Shanghai, 23 days.

Mr. Y. Arimori, owner's Pacific Coast representative, is now located in our San Francisco office.

Pacific Atlantic Elects Offiters

Results of the recent meeting of the Board of Directors of the Pacific Atlantic Steamship Company, Portland, Oregon, were:

S. P. Fleming, of Portland, elected president. He was formerly treasurer of the company.

R. A. Nicol elected vice president and general manager, with headquarters in New York. He has been general manager of the Atlantic Coast since the inception of the company, and has been stationed in the same location.

A. R. Lintner elected Pacific Coast manager, with headquarters in Portland. He was formerly connected with the Portland office of the U. S. Shipping Board, subsequently being sent to the Orient by the States Line, whence he was transferred to Portland and later to Seattle for the company.

The resignation of **K. D. Dawson** and **W. T. Sexton**, his assistant, made the election necessary. Dawson is vice president of I. M. M., in charge of the company's Pacific Coast activities.

P. M. R. Personalities

At a recent meeting of the Los Angeles Breakfast Club, celebrating the national observance of Foreign Trade Week, the presiding officer introduced the co-host, **Harold C. Smith,** as vice-president of Williams, Dimond & Company. This news came as the first public announcement of Smith's advancement after an election held in San Francisco some days before. **R. A. McLaren,** the other vice-president of the company, is also treasurer; Smith is also district manager in Southern California. The elevation of the latter was effected with the retirement of **Henry W. Poett** as president and the naming of **Ernest L. McCormick** to the office.

It's another boy for one of Grace Line's executives—this time, **Fred Ducato,** who is in charge of the freight department. One day last month he arrived at the office whistling, and unwrapped cigars and candy for his friends in celebration of the great event. The baby weighed seven pounds, and he and his mother are doing fine.

E. A. Read, formerly a member of the neutral rate committee of the Pacific Coast Conference, has become assistant traffic manager of Swayne & Hoyt, Ltd., in charge of rates and revisions. His headquarters are in San Francisco.

A recent marriage was that of **John Cummings,** who is assistant manager of Westfal-Larsen Line's services at the General Steamship Corporation. Miss Betty Jean Gordan is the bride, daughter of Mr. and Mrs. John Gordan of San Francisco. After the ceremony, while San Francisco was celebrating the opening of the Golden Gate Bridge, the couple left for Southern California on a honeymoon. Cummings has been with General Steamship since graduation some three years ago.

J. G. Stumpf, assistant to Walter McPherson, vice-president of the American-Hawaiian Steamship Company in the New York office, arrived in Los Angeles some weeks ago on the Kansan, American-Hawaiian freighter. He will make a business survey of that and other Pacific Coast cities, as he handles executive traffic matters in the New York office and is principal contact man for the company with the Intercoastal Steamship Freight Association.

The appointment of **J. J. Summersby,** assistant vice president of Worthington Pump and Machinery Corporation, as general sales manager of that corporation, was recently announced. This appointment is an extension of Summersby's previous responsibilities, for a further concentration of direction of the corporation's general sales department.

Summersby joined the Worthington Pump and Machinery Corporation as a sales engineer immediately after his completion of post-graduate work at Washington University in 1920, and has been continuously identified with the organization since then as district sales manager, divisional sales manager, and assistant general sales manager.

In the office of **R. J. Briggs,** who is a member of the McCormick Steamship Company's Los Angeles freight staff, is displayed a gold-plated loving cup presented to him recently by officials of the Montebello Golf and County Club for his skill in golf. Briggs took part in the eighth annual Montebello Championship Tournament, representing the Brookside Golf Club of Pasadena, of which club he is vice president. He is also an active member of the Rail and Water Club.

After 34 years with the steamship department of Balfour, Guthrie & Co., most of which were spent in Portland, **Frank S. Gray** has retired from the managership of the organization. He has been succeeded by **Donald S. Cameron,** who came to that city three years ago as assistant to Gray, himself being succeeded by **R. G. S. Atkinson.**

Sh-Sh-Sh! There are Diesels Below Deck

"Captains Courageous," in the actual New England fishing trade head their craft up to the wind with new assurance because of stout Diesel engines below deck; and in the screen version of Kipling's famous yarn, the salt-bitten Gloucesterman that Metro-Goldwyn brought all the way from Cape Ann to Catalina by way of the Panama Canal, is equipped with a six-cylinder Cooper-Bessemer Diesel of 180 horsepower.

Why not? Hardy as they are, your Down East fishermen are practical fellows, too, and since their voyages on the deep have the motives not of a sport but of a business, they suffer no abatement of dignity when they adopt any means that will enable them better to breast the gale, ride the seas, make the Banks, and come home again with a cargo.

As for the picture vessel, she is an authentic and seasoned schooner of the real old Gloucester breed, sturdy and capable from stem to stern but finely modeled as a yacht. The Oretha F. Spinney she was, long the property of Captain Carl Olsen of Gloucester, before keen eyes of the Metro-Goldwyn-Mayer Corporation fixed on her as just the right ship for the fine picture that Metro was to make. She carries her canvas as proudly and as well now as when there was no auxiliary power to determine the issue between sail and weather in case of need, and when less sophisticated mariners than Freddie Bartholomew, Lionel Barrymore, or Spencer Tracy set her yards and pulled her rigging taut.

As we go to press, word comes of the death of **Fred L. Nason,** head of the Canadian Pacific in this city, who died in Auburn after twenty-five years of service with the company.

Nason had been ill for several months, but was thought well on the way to recovery when the news came of his passing. He was 57.

Since 1912 he had been general agent for C.P.R. He is survived by his widow, a daughter, and a son.

Problems Answered

(Continued from Page 27)

change in conditions. In any event, actual rubbing, metal to metal, or failure of lubrication, will result in a wiped bearing long before we can notice it in oil temperatures. Therefore all possibilities lie with the oil itself. This may be either entrained foreign material or loss of lubricating qualities. This latter is the same as saying a reduction in viscosity below the point where the film is maintained. Little can be said regarding foreign material. The engineer must be as careful in handling his oil as the hospital staff are in handling surgical equipment. Great care looking toward cleanliness in the oil is necessary. Samples taken and allowed to settle in a test tube or bottle may disclose sediment. A train of propulsion gears misbehaving may contribute much to contamination of the oil, with minute metallic particles.

QUESTION

How should oil be taken care of?

ANSWER

Centrifuging is an excellent way of removing sludge, foreign material and water. Land plants accomplish the same result by settling in tanks for months at a time.

Watching the oil cooler coils and strainers for foreign material will indicate the condition of the oil. Centrifuging when the oil needs cleaning or batch treatment is satisfactory, but better still is the continuous by pass system, where a small amount is continuously withdrawn from the system, centrifuged, and put back into the tank for circulation. A centrifuge capable of handling from 1 to 5 per cent of the system capacity per hour should be adequate.

Starting with a new, or largely all new oil, it is desirable to draw off a small bottle sample, date it, and set it beside a similar sample of new oil. Do this every week or so and note the gradual darkening of the color. This is normal oxidization, and in time no further darkening will take place. Further change will be toward the cloudy or muddy appearance or settled sediment. This indicates need of cleaning.

QUESTION

What factors contribute to reducing the lubricating qualities or age the oil?

ANSWER

There are four principal aging factors:

(1) Sludging.

(2) Forming an emulsion.

(3) Foaming and oxidizing.

(4) Breakdown or fractionating.

Sludging is an oxidizing process. The oil oxidizes slowly, forming a brownish or blackish slime which collects on cool surfaces such as coils of coolers, drains and strainers. It is increased by mixing with air, churning or spraying. High temperatures also increase it.

An emulsion is a mechanical mixture of an oil and water. While ordinarily water settles out readily, nevertheless in the presence of certain foreign substances, such as dust or fine foreign particles or oxide, sludge may form a permanent emulsion, which causes the oil to appear cloudy or muddy. Thus air and water should be kept away from the oil as much as possible.

Foaming is a mixture with air, and may be reduced by reducing the oil pressure somewhat. It also has to do with lesser understood factors, such as surface tension and certain foreign substances. Too much foaming may call for reconditioning the oil.

The best oil should not fractionate or break down to any great extent. However, probably all oils, particularly the poorer grades of oil, will to some extent actually change their characteristics, a portion of this volume changing to lighter products with less lubricating qualities. They affect the total oil by mixing, giving the appearance of lost lubrication or worn out oil. Oil does not really wear out, but part of it fractionates to thinner and more volatile products, or to sticky thickened portions.

QUESTION

How should oil be specified in buying?

ANSWER

(1) If possible consult the lubricating engineers of the oil manufacturer.

(2) Describe the use of the oil and operating temperatures.

(3) Specify the viscosity, and to be a pure mineral

oil. Flash point not less than 340 or 350 F. open cup test.

(4) Oil to be free from:

(a) Tarry, slimy or saponifiable matter.

(b) Acids, soaps or thickeners.

(c) Water, dirt, grit, or other suspended matter.

(d) A tendency toward rapid breakdown, carbonization or sludging.

(e) A tendency toward permanent emulsification.

QUESTION

What is the Navy specification for oil?

ANSWER

The Navy has over a dozen specifications for lubricating oil. The one usually used for turbines in circulating systems with oil temperatures over 140° F. is as follows:

Specification No. 2190:

Color	No color requirement
Reaction	Neutral
Neutralization No. max.	.10
Fixed or fatty oils	None
Precipitation number	None
Free sulphur or corrosive	None
SO_3 as sulphonates	None
Water	None
Carbon residue max.	.40%
Nature of carbon residue	Loose and flaky
Ash, max.	None
Total sulphur, max.	.50%
Nature of oil	Pure mineral
Flash point, min.	350° F.
Pour point, max.	35° F.
Viscosity, Seconds Saybolt	185 to 205 at 130° F.
Emulsion test (maximum time to settle out)	30 minutes for distilled water
Emulsifying constituents with steam	None

Our next issue will discuss valves, control and governing of turbines.

The Fire Extinguishers that Save Recharging Dollars

A new four-page color brochure now being distributed by Walter Kidde & Company, Inc.

The new Kidde and Anti-Freeze extinguishers described in this booklet eliminate many disadvantages of the old type soda and acid extinguishers. In these new units pure water is discharged by the pressure supplied by a cartridge of carbon dioxide gas. The gas will not deteriorate with age, and thus the extinguisher needs refilling only after use. There is no acid damage. A metering device makes possible instantaneous long range constant stream of pure water effective at all temperatures.

These extinguishers have the official approval of both the Underwriters and Factory Mutual Laboratories and have passed the exacting tests of the U. S. Bureau of Marine Inspection and Navigation.

New Heavy Duty Diesel for the Small Power User

A new Fairbanks-Morse diesel, the Model 42-E, has been developed to meet the demand of small power users for a heavy-duty, continuous-service stationary engine. It is available in two- and three-cylinder combinations with ratings of 60 and 90 horsepower at 450 r.p.m., and can be furnished for direct-connected, belt or electric generator drive.

With an 8¾ inch bore and 10½ inch stroke, this diesel is smaller and lighter than the F-M Model 32-E, but it embodies all of the proved features that have led to the daily use of several hundred thousand horsepower of the larger engines. It is small enough to be installed where space and head room are limited, and it is applicable for any power requirement within its horsepower ratings.

This new model diesel is characterized by extreme simplicity of design and operation. Two important principles, direct airless injection of fuel and two-cycle design with crankcase scavenging, result in use of an absolute minimum of moving parts. This, along with a medium-low speed, of course means greater reliability and lower maintenance cost.

The power impulse on each downward stroke assures a uniform output without need for an abnormally large flywheel. Cylinder heads are simplified by the elimination of air inlet and exhaust valves with their attendant operating mechanism. All working parts are enclosed, yet are readily accessible for inspection and maintenance.

Riverboat Renamed

The breaking of the usual bottle of sparkling wine on the steel bow of a famous and popular Portland riverboat officially changed the name from Georgianna to Lake Bonneville at an early June ceremony. Miss Myrtle Cradick, betrothed to Portland's mayor, Joseph K. Carson, was the woman in the case.

Portland Notes

(Continued from page 42)

impregnated terminal constructed at the end of the south jetty a year ago. The asphalt failed to hold the terminal together during the winter, and will require replacing within a few years, according to R. E. Hickson, chief engineer for this district.

A small jetty about one mile long, extending directly south from Cape Disappointment, will be built at the same time the larger one is reconstructed, according to plans.

● **Labor Troubles Continue.** Portland steamship operators continued to suffer labor pains during June, featured by the 12-day tie-up of the Calmar Line steamer Portmar when the unlicensed members of the crew demanded West Coast articles instead of the East Coast articles under which they had been signed. The crew was dismissed and the vessel lay, completely loaded and ready to sail for New York, alongside a lumber wharf until an agreement was reached between W. H. Usher, San Francisco, Pacific Coast manager of the line, and Joseph Curran, leader of the left wing seamen's group of the East Coast. Curran was in Portland attending the convention of the Maritime Federation of the Pacific.

● **Ship Loads Pulp for England.** One of the most unusual export cargoes of the season was a 500-ton shipment of paper pulp from Portland to England on the Furness liner Pacific Pioneer. This was reported to be the first pulp shipment from this section to England, where pulp is usually purchased from Scandinavia.

● **Portland Personals.**

As the States Line steamer General Sherman neared the end of her service for the Portland company, **Captain H. C. Dyer**, her master, was pulled off the bridge and placed in the operating office, succeeding **Captain Vance D. Trout**, resigned to accept the position of superintendent of operations for Panama Pacific Line at San Francisco.

Captain Joseph C. Smith, 35-year-old Portlander, was raised from chief officer of the General Sherman and placed in command. Captain Smith first went to sea fourteen years ago as an ordinary seaman on the old Montague.

Marianne Long Franklin is the new president of the Women's Traffic & Transportation Club of Portland, an organization of women employed in steamship, rail, truck and air line offices.

After 34 years of service for Balfour, Guthrie & Company, **Frank S. Gray**, manager of the steamship department at Portland, retired recently, and his post was assumed by his assistant, **Donald S. Cameron**.

Phillip H. Carroll, executive secretary of the Commission of Public Docks, and **A. D. Merrill**, chief engineer for the Commission, plan to attend the forthcoming sessions of the Pacific Coast Association of Port Authorities at San Diego, Cal., in September. **A. H. Averill**, vice-chairman of the Portland Dock Commission, is slated to become president of the Pacific Coast group, and Portland is scheduled to be the convention city in 1938.

PACIFIC MARINE REVIEW

AUGUST 1937

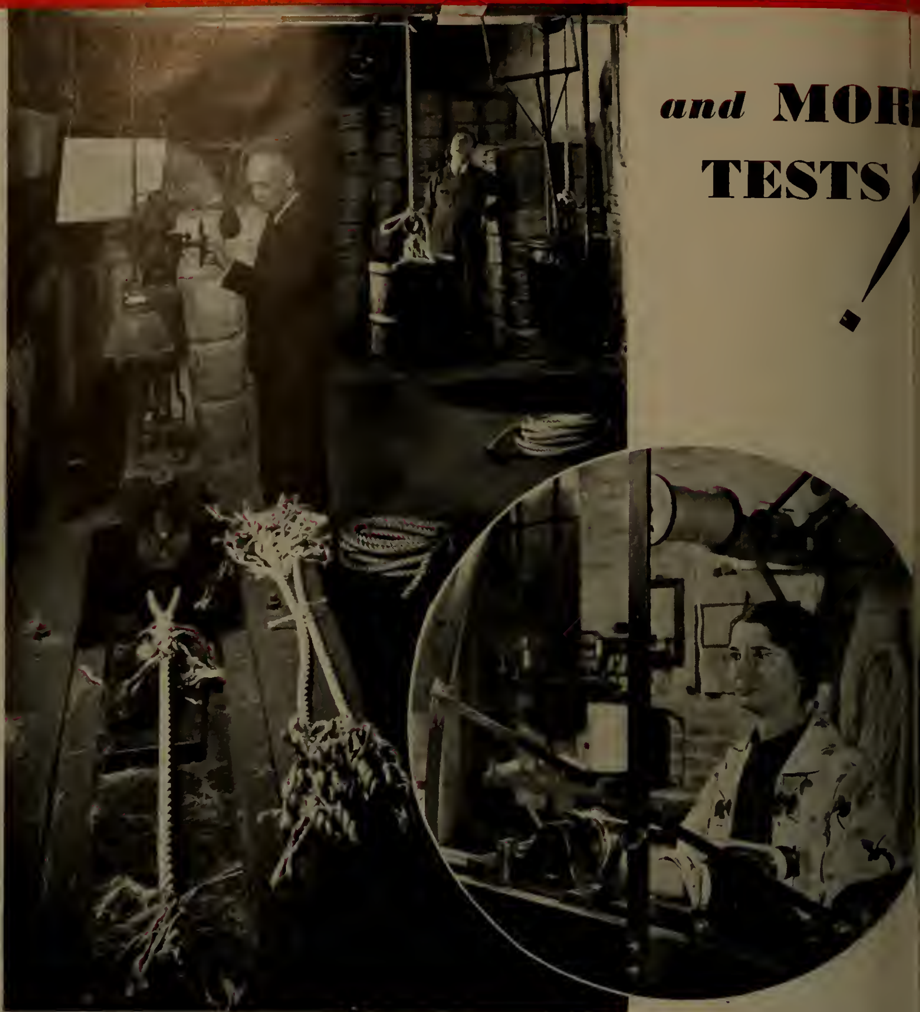
U. S. Army Transport St. Mihiel pioneers in equipping under new emergency regulations . . . See in this issue "52nd Supplement"

The Story of TUBBS ROPE

number eight of a series

(inset)—before being formed into strands, the yarn is tested for strength on machines which accurately register the breaking point.

The finished rope is tested both for breaking strength and for endurance, the latter by a "fatigue" or "torture" test which actually gives the rope the equivalent of months of ordinary wear in a short time.



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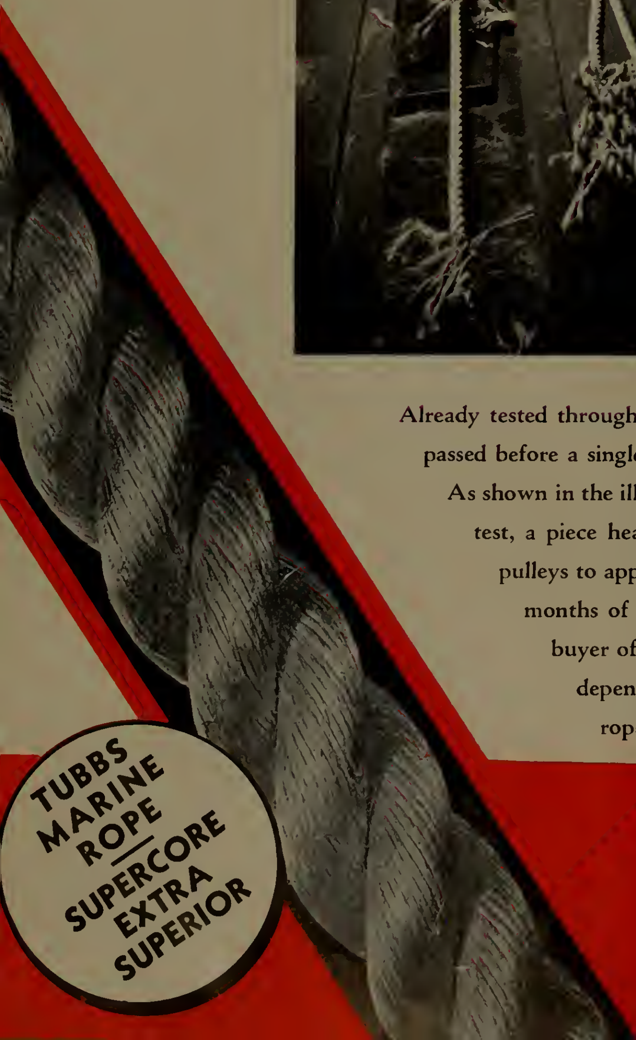
Already tested through each preliminary stage, still more tests must be successfu passed before a single coil of Tubbs Rope is allowed to leave our warehous As shown in the illustration above, even the finished rope is given a "tortur test, a piece heavily weighted on both ends being run continuously ov pulleys to approximate in a short time the wear it might receive in mai months of actual usage. It is such rigid care as this that assures tl buyer of Tubbs Marine Rope a product that is more uniform, mo dependable, and one that offers a greater value for eve rope dollar. Tape marked identified so you can be SURE.



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PACIFIC MARINE REVIEW

AUGUST, 1937
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CONTENTS

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MARINE ENGINEERING HEADQUARTERS

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"XZIT" Soot and Fire-Scale Remover

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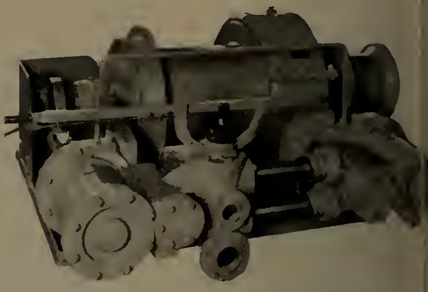
"AUTO-KLEAN" Mechanically Cleaned Filters

DAVIS ENGINEERING CORP.
Paracoil Water Heaters, Evaporators, Heat Exchangers

The Allan Cunningham Li

Winches, Windlasses, Steering Gears, Etc.



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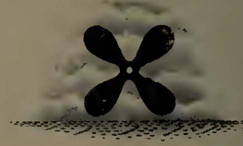
SEATTLE
MARINE AUXILIARY MACHINER



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PACIFIC MARINE REVIEW

VOLUME XXXIV | AUGUST 1937 | NUMBER 8

Editorial Comment

Wages, Hours and Working Conditions

The Maritime Commission is charged by law with the duty of investigating wages, hours and working conditions aboard American vessels that are operating under a subsidy in the foreign trade of the United States. The Bureau of Marine Inspection and Navigation is charged by law with the duty of inspecting crew's quarters on every American vessel, and has power to prevent the clearance of such vessel from any American port unless these quarters are ample in space, well ventilated, and kept in a sanitary condition.

Hearings on this question have been held in the important ports of both coasts during July by representatives of the Maritime Commission. At these hearings various agents of marine labor unions presented a very dismal picture of the allegedly terrible conditions aboard American deep sea vessels, and made very large demands for more men, more space, and more wages. Officials of operating companies, on the other hand, pointed out that the conditions, manning scales, wages, and food aboard American seagoing ships were much more favorable to the crews than those aboard the ships under any other flag.

Demands of the crew representatives would, if granted, increase the crews, increase the living space allotted to each member of the crew, increase the wages of each member of the crew, decrease the hours on duty of each crew member, give each crew member a vacation with pay, provide a separate menu to meet the individual desires of each crew member, and provide individualistic furnishings and equipment for each crew member. In these demands the official representatives of the licensed officers associations joined avidly. There is therefore no point in differentiating between officers and crew. The word "crew" includes all the personnel of the ship.

To the average citizen reading these complaints and demands as published in the daily press there comes promptly the reaction, "Well, why not grant these demands; the Government will pay the difference in costs and the shipowner will not be any the poorer." We have heard this expression often from men in the street.

A little analysis, however, shows many answers to such a query. It is true that under the new subsidy law the United States agrees, under certain conditions, to grant operating subsidies to American flagships in the foreign trade. These subsidies do not guarantee any profits. They do agree to pay an operating subsidy in amount "not to exceed the excess of the fair and reasonable cost of insurance, maintenance, repairs not compensated for by insurance, wages and sustenance of officers and crews, and any other items of expense in which the Commission shall find and determine that the applicant is at a substantial disadvantage in competition with vessels of a foreign country hereinafter referred to, in operation under United States registry of the vessel or vessels covered by the contract, over the estimated fair and reasonable cost of the same items of expense (after deducting therefrom any estimated increase in such items necessitated by features incorporated pursuant to the provisions of section 501[b]) if such vessel or vessels were operated under the registry of a foreign country whose vessels are substantial competitors of the vessel or vessels covered by the contract."

Sec. 501[b] is part of the article on construction subsidy, and provides that all plans for new vessels shall be submitted to the "Navy department for examination and suggestions for changes therein as may be deemed necessary or proper in order that such vessel shall be suitable for economical and speedy conversion into a naval or military auxiliary."

The construction costs of all changes made at the suggestion of the Secretary of the Navy is paid to the

shipbuilder by the Commission. The remainder of the vessel's cost is used as the American shipbuilding cost in computing the construction subsidy paid by the Commission.

It will be evident that the law does not contemplate paying any operating subsidy for any loss of revenue caused by the changes made at the suggestion of the Navy. And it may be also taken for granted that the law does not contemplate any operating subsidy for loss of revenue on account of more space given to crew's quarters. The construction or reconstruction costs for this item will be covered by construction subsidy, but unless its annual cost shows on the books as an item of disbursement there would be very little chance of including it in an operating subsidy under this law.

Present demands of unions would, if granted, force American shipowners to provide on their ships much more space for the crew and officers than would be required on the ships of foreign competitors. Such additional space would be revenue space, and its diversion to non-revenue use would be a very severe handicap on the American Merchant Marine.

Another interesting aspect of this question is its relation to coastwise and intercoastal shipping. While the present hearings refer only to foreign trade shipping, and the Maritime Commission has power to impose conditions of manning, wages, hours, and living quarters only on foreign trading subsidized vessels, it must be apparent to anyone who has watched American union labor in action that any conditions favorable to labor that are maintained on any American ship must soon be imposed on all.

Greater in volume than American Foreign Trade Shipping is American Coastwise and Intercoastal Shipping. It, however, gets no subsidy, except that ancient provision of Federal law which reserves such shipping to American flag vessels. Its only competitors, therefore, are railroads and truck and bus lines ashore. This competition is very keen and is becoming more so every year.

On the Pacific Coast, with its splendid system of paved highways, the truck and bus competition is especially keen, and much of the cargo items formerly known as "plunder" now travel coastwise almost exclusively by truck. Many of the old coastwise lines on the Pacific Coast are now definitely out of business as a result of the impossible conditions imposed by the demands of labor plus this competition.

In the Intercoastal Steamship business quite a number of the smaller lines have been unable to survive under present conditions.

It would be well, therefore, for the Maritime Commission to weigh carefully all the conditions before making any drastic changes in manning scales, wage scales, food scales, and living quarters aboard American vessels.

Very certain it is that any concessions granted to the leaders now at the head of American maritime unions will result solely in creating new demands. The duty of the Maritime Commission is to build up the Merchant Marine of the United States with two objectives in view: first, so as to give more efficient and more economical sea transport for the foreign, intercoastal and coastwise trades of this country; second, so as to give the naval forces of this country an adequate auxiliary force in time of emergency.

No consideration of the personal ambitions of labor leaders should be allowed to divert the Commission from this duty. No conditions should be imposed on any subsidized vessel that are not imposed on all American vessels. Too many unfavorable conditions are now imposed on all American vessels under present rules and laws.

Maritime Labor and the Merchant Marine

The long-suffering American Merchant Marine is once more facing a crisis with labor. The present agreements with the Unions expire shortly. That the Pacific Maritime Federation is in the mood to make practically impossible demands is evidenced by the testimony of the leaders of marine unions before the hearings on working conditions held by the Maritime Commission during July in San Francisco and in Seattle.

This, coupled with the evident desire of the administration to placate labor leaders, rather puts the American ship operator on the spot. On the Pacific Coast the operators have taken the obvious course. Under the leadership of Almon E. Roth they have formed a Pacific Coastwide organization of Waterfront Employers which will enable them to take a united stand and present a united front in all disputes or arbitrations with labor.

The labor problem is one principal factor in the domination of American shipping today. Our ships are footballs kicked around between C.I.O. and A. F. of L. groups—pawns for the personal grievances or ambitions of a Mr. Lewis, a Mr. Greene, or a host of lesser labor leaders.

The other dominating factor is the United States, which, through the Maritime Commission and the Bureau of Marine Inspection and Navigation, possesses and exercises absolute control over ship construction, ship finance and ship operation.

In the last analysis, the Maritime Commission really dominates maritime labor, and, as we have often said before, the one thing necessary to clear up the situation is an authoritative pronouncement from that body as to its future policy on labor and the merchant marine.

1912—Pacific Marine Review—1912

Do you remember twenty-five years back what was happening to the American Merchant Marine? Here are a few choice bits from the August, 1912, issue of Pacific Marine Review, which was then a lusty youth eight years old. This issue was published at the Arcade Annex, Seattle, Washington: H. B. Jayne, Proprietor; Captain E. Francke, Editor; J. S. Hines, Advertising Manager.

Representative Sulzer had introduced a bill creating a separate Department of Labor, which had been passed by the House and was pending in the Senate. The following (gem?) is taken from the speech in support of this bill made by its sponsor:

"I am no demagogue. I believe in fair play to all. I am opposed to anything that will estrange employer and employee, or cause a breach between capital and labor, and I am a friend of both. I want to give all an equal chance. I want to do all I can while I live to make the world better and happier and more prosperous.

"I believe in the dignity of the toiler, the greatness of labor, and I want to do everything I can in Congress and out of Congress to protect its inherent rights and promote its general welfare for the lasting benefit of all the people. I want labor to have as much standing as capital in the halls of Congress and at the seat of government. We have a department to represent finance; we have a department to represent war; we have a department to represent diplomacy; we have a department to represent our internal affairs; we have a department to represent commerce; we have a department to represent justice—all supported by the wage earners—and in the name of common sense why should we not have a department to represent industrial peace as exemplified by labor, the most important, in its last analysis, of them all?"

Frank Waterhouse and Company Inc. had notified all interested parties that, after the sailing of their steamer Hercules in August, they would no longer run steamers from Portland, Oregon, to Oriental ports on a regular schedule.

Shipping. There was a fair demand from Japan and Hongkong for wheat and flour, but space in regular steamers and charter rates for outside tramp tonnage were held at high premium. Regular tariffs on flour were set at \$3.50 Japan, \$4.50 Hongkong, and \$5.00 Manila, but the line managers were demanding and getting \$1.00 premium for space.

Shipbuilding was also improving. At the yards of Seattle Construction & Dry Dock Company on July 18 they had launched the new steel passenger steamer Potlatch, 158 feet by 27 feet by 8 feet 9 inches, powered with a 750 horsepower triple expansion engine for a contract speed of 13 knots. Two Seabury oil burning water tube boilers supplied the steam.

Another passenger steamer was on the ways—the Tacoma, 221 feet by 30 feet by 10 feet, powered with a 4 cylinder triple 3500 I. H. P. engine taking steam from two Ballin water tube boilers, contract speed 19 knots.

In addition to these, the Seattle Construction and Dry Dock Company had under construction:

Two submarines for the Chilean Government;

The seagoing suction dredge Col. P. S. Michie, for the U. S. Engineers work at Coos Bay;

Four submarines for the United States Navy; and

The steel freighter Sockeye for the Inland Navigation Company.

Moore & Scott Iron Works of San Francisco were building at their Oakland yard, a steel ferry 230 feet x 62 feet 6 inches x 19 feet 6 inches, of the double end screw propeller type, for the Western Pacific Railway passenger service between Oakland and San Francisco.

Titanic. For the report issued by the British Court of Inquiry into the Titanic disaster, H. B. Jayne, publisher of Pacific Marine Review, had nothing but scorn. Said he:

"Although a certain ignorant, prejudiced and sycophantic section of the British press may hail this report as a 'masterpiece' (as I have read) and bow the knee to Lord Mersey, I do not hesitate to state that practical men, competent men, unprejudiced men, throughout the world, must agree that the 'Mersey mountain has labored and brought forth a miserable Mersey mouse,' and I invite our London exchanges and the number of shipping and marine insurance offices we enter in London and Liverpool to take issue with me, and also Lord Mersey himself. In the Washington investigation, although certain technical advisors of skill—equal to any skill in the world—were present, in fact had prepared sensible and proper questions, which the chairman saw fit to suppress in favor of his own silly questions, they were not officially attached to the committee and could only sit in silence and painful humiliation; in fact several left the room when the limit of patience was reached, but in the case of the much heralded British inquiry in London, skilled assessors were officially attached, but the same arrogance and conceit of the president, as at Washington, made their presence practically valueless.

"From the technical committee appointed to study water tight divisions, etc., we shall probably get something useful, but beyond harrowing a few survivors and recording a few facts almost as obvious as the sailing date and date of the disaster, neither the Washington nor the London investigation has accomplished anything."

Naval Training for Seamen

By Adolphus Andrews

1. The Naval Appropriation Act for the fiscal year 1938 contains funds for initiating the training of 100 officers and 120 enlisted men of the Merchant Marine Naval Reserve. This first year's training must be considered more or less experimental and the future development of this branch of the Naval Reserve will greatly depend upon the success of the initial training.

2. Navy Department plans contemplate gradually building up the Merchant Marine Naval Reserve to approximately 5,000 officers and 35,000 men. At present there are enrolled 3,450 officers and no enlisted men. About 800 officers have completed correspondence courses conducted by the various Naval Reserve Educational Centers. No merchant seamen have been enlisted on account of the lack of funds for training them.

3. It is considered that the training of the merchant marine personnel involves two distinct problems:

(a) The procurement and initial training of personnel to operate the merchant marine in time of peace.

(b) The naval training and indoctrination of the personnel to operate in time of war or emergency those vessels which have been designated as being suitable for naval auxiliaries.

4. The Navy Department is interested in both problems of training, but contemplates providing for the naval training only during the first year. However, it is Navy Department policy to cooperate with the Maritime Commission, the Department of Commerce, the Coast Guard or other Government agencies and maritime interests in every way practicable in the procurement and initial training of personnel for the merchant marine. It is hoped that a satisfactory method of procurement and recruit training can be worked out later in cooperation with interested parties.

5. For initiating training during the first year, it is desired to select merchant-marine personnel now employed on board vessels designated as being suitable for naval auxiliaries for naval training. Emphasis will be given to the training of officers in communications; gunnery and fire control; routine emergency drills; damage control; tactics; handling of the ship in formation; naval methods, procedure and organization. Enlisted men will be instructed in communications, gunnery, damage control, emergency drills, handling boats, naval methods and procedure.

6. The plan for the first year's training will be as follows:

(a) Approximately 70 officers will be trained in vessels of the fleet. The port of embarkation will be San Pedro. The Commander in Chief will designate certain battleships and heavy cruisers for conducting this training. The Commandant of the Twelfth Naval District will arrange directly with the Commanding Officers of vessels designated for embarking merchant-marine officers for training. This training duty may be performed at any time between July 1, 1937, and June 30, 1938.

(b) Approximately 30 officers and 120 men will be trained in a battleship operating in Atlantic waters, during the period October 2 to 15, 1937. The port of embarkation will be New York. The commandant of the third naval district will arrange with the commanding officer of the battleship designated as to the details of embarkation and disembarkation.

(c) The commandants of the third and twelfth naval districts will prescribe quotas of officers and men to be furnished by the various shipping lines for training duty. Lines operating between New York and San Francisco will receive quotas from the commandant twelfth naval district, San Francisco.

(d) In the selection of officers for training, preference will be given to those who have completed naval correspondence courses. Preference will also be given during the first year to men who have enlisted in the Naval Reserve as seamen first class or firemen first class or higher rating.

(e) All training duty will be performed with pay and allowances of the naval rank or rating held in the Naval Reserve. In addition, each officer and man will receive travel expenses. Enlisted men will be furnished subsistence on board and will be provided with a clothing outfit.

(f) The average training duty with pay and allowances will be for 2 weeks. However, in order to suit the convenience of the individuals in arranging for their absence from the merchant vessels in which employed, longer or shorter periods of training may be arranged in certain cases. Special arrangements may be made for additional training periods, either as a continuation of the 2 weeks' training duty with pay, or to be taken at other times, provided that this training duty is performed without expense to the Navy Department.

(g) Lt. Comdr. C. S. Bookwalter, United States Naval Reserve, will be the Navy recruiting officer in the port of New York for the purpose of enlisting men in the Merchant Marine Naval Reserve. His office is located at naval district headquarters, Washington and Christopher Streets. Recruiting of enlisted men in the Merchant Marine Naval Reserve has been authorized to start immediately, but in the third naval district only.

7. The Bureau of Navigation invites the cooperation of ship owners, operators, and officials of the various shipping lines, as well as officials and members of maritime organizations, in making a success of the Navy Department program for training merchant-marine personnel. All interested parties will be benefited. The Navy Department will benefit by having a reserve

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Licensed Officers' Promotions

The following list of American licensed officers for the Coastwise and Ocean services has been approved by the Pacific Coast offices of the Bureau of Marine Inspection and Navigation for original grade or raise in grade during June, 1937.

Name and Grade	Class	Condition
PORTLAND		
Charles F. Fairbrass, 2nd Asst. Eng.	OSS, any GT	O
Francis C. West, 2nd Asst. Eng.	OSS, any GT	RG
Michael E. Jacobson, Chief Eng.	OMS, 300 GT	O
John V. Waters, Jr., Chief Eng.	OMS, 300 GT	O
2nd Asst. Eng.	OMS, any GT	
SAN FRANCISCO		
Charles J. Tulee, Master	OSS, any GT	RG
Hans O. H. Matthiesen, Master & Pilot	OSS, any GT	RG
Hans A. Crauel, Chief Mate & Pilot	OSS, any GT	RG
Francis W. Wight, 2nd Mate	OSS, any GT	RG
Francisco Vidal, 2nd Mate	OSS, any GT	O
Leonld C. Asseeff, 2nd Mate	OSS, any GT	RG
Walter G. Hillert, 2nd Mate	OSS, any GT	O
Jon H. Thuesen, 2nd Mate	OSS, any GT	RG
Reginald Atthowe, Jr., 3rd Mate	OSS, any GT	O
Rinaldo Bellero, 3rd Mate	OSS, any GT	O
Anton T. Jones, 3rd Mate	OSS, any GT	O
William J. Wagner, Jr., 3rd Mate	OSS, any GT	O
John L. Martensen, 3rd Mate	OSS, any GT	O
Charles D. Hammel, 3rd Mate	OSS, any GT	O
Roy C. Thompson, Chief Eng.	OSS, any GT	RG
Gerrit de Raad, 1st Asst. Eng.	OSS, any GT	RG
Wesley W. Basford, 1st Asst. Eng.	OSS, any GT	RG
William B. Coles, 1st Asst. Eng.	OSS, any GT	RG
Jack B. Curry, 1st Asst. Eng.	OSS, any GT	RG
Francis X. George, 2nd Asst. Eng.	OSS, any GT	RG
Clyde C. Ermill, 2nd Asst. Eng.	OSS, any GT	O
Edward F. Price, 2nd Asst. Eng.	OSS, any GT	O
William R. Wyllie, 2nd Asst. Eng.	OSS, any GT	RG
Victor F. Buenzle, 2nd Asst. Eng.	OSS, any GT	RG
John G. Ellis, 2nd Asst. Eng.	OSS, any GT	RG
George C. Guglielmoni, 2nd. Asst. Eng.	OSS, any GT	O
Joseph M. Bell, 2nd Asst. Eng.	OSS, any GT	RG
Ralph R. Clay, 3rd Asst. Eng.	OSS, any GT	O
William P. Cubitt, 3rd Asst. Eng.	OSS, any GT	O
David E. Chaplin, 3rd Asst. Eng.	OSS, any GT	O
Vincent J. McGarry, 3rd Asst. Eng.	OSS, any GT	O
Vladimir V. Moller, Chief Eng.	OMS, any GT	RG
Wayne F. McNeil, 1st Asst. Eng.	OMS, any GT	RG
SAN PEDRO		
Don G. Hamrick, Master	Coastwise Steam, 100 GT	O
Floyd Otto Smith, Master	Coastwise Steam, 100 GT	O
Otto T. Matthies, Master & Pilot	OS, Yacht, any GT	RG
Christopher Farevaag, 2nd Mate	OSS, any GT	O
George Garvin, 2nd Class Pilot	OSS, 150 GT	O
Robert L. London, 2nd Class Pilot	OSS, 150 GT	O
Lee I. Humiston, Chief Eng.	OSS, any GT	RG
Jack Law, 1st Asst. Eng.	OSS, any GT	RG
Raymond J. Pierrepont, Jr., 2nd Asst. Eng.	OSS, any GT	O
Hubert C. Everingham, 3rd Asst. Eng.	OSS, any GT	O
Daniel R. Farnham, 3rd Asst. Eng.	OSS, any GT	O
Ole D. Johnson, 3rd Asst. Eng.	OSS, any GT	O
Lester L. Maxfield, Chief Eng.	OMS, 500 GT	O
George M. McPhie, Master	OSS, any GT	RG
John J. Kelly, Master	Ocean Fishing, any GT	O
Second Mate	OSS, any GT	
Elias R. Hansen, Master	Ocean Fishing any GT	O
Third Mate	Coastwise SS, any GT	
John J. Kelly, Master	Ocean Sail, any GT	O
Rhodes E. Day, 3rd Mate	OSS, any GT	O
George E. Kemp, Mate	Inland SS, any GT	O
Pilot	OSS, any GT	
Julius R. Pensworth, Chief Eng.	OMS, any GT	O
Peter J. Sommerseth, Chief Eng.	OMS, any GT	O

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Scholarships for Foreign Study Awarded by Naval Architects

An award of two scholarships for further studies in naval architecture and marine engineering at institutions of higher learning in England and Italy has just been announced by The Society of Naval Architects and Marine Engineers, 29 West 39th Street, New York. The society periodically gives this opportunity to outstanding students in naval architecture and marine engineering in the several American schools and colleges which offer this course.

Recipients of the awards this year are S. Curtis Powell and A. Dudley Haff. Powell graduated in 1937 with the degree of Bachelor of Science from Massachusetts Institute of Technology, Cambridge, Mass., and received a scholarship at Regia Scuola D'Ingegneria Navale Di Genova (Royal School of Naval Engineering of Genoa). His home is in North Billerica, Mass.; he was born in Boston in 1915, and is a graduate of the Littleton, Mass., High School. He left for Italy on June 24 and will spend the summer working in one of the Italian shipyards.

A. Dudley Haff was graduated from Webb Institute of Naval Architecture, Bronx, N. Y., in 1937, and was awarded a scholarship for a course at Cambridge University, England. Graduating with the degree of Bachelor of Science, he is a resident of Hempstead, Long Island, N.Y., where he was born in 1916, and a graduate of Hempstead High School. He will leave for England sometime in the summer.

Fulflo Filter For Diesel Fuel Oil

A filter well known in industrial fields for the final clarification of liquids generally is announced for the purification of diesel fuel oils by the Commercial Filters Corporation.

The accompanying illustration shows the unique manner in which the Fulflo Filter tube is constructed of cotton yarn and wound into tube form upon a metal core to provide a compact filter element and ease of assembly.

The filter tube in turn is mounted on two seat plates having a patented recessed center which seals both ends to prevent by-passing of unfiltered oil. The tube assembly is then held in place in the filter shell by spring tension to compensate for varying pressures.

Based upon the principle of depth filtration with uniform density, the filter will handle any grade of fuel oil at any temperature and against pressure of from one to a hundred pounds per square inch without modifying the filtering element.

This filter is generally installed between the transfer pump and the injector pumps, taking the full flow of fuel oil with a very low pressure drop. Other installations upon stationary diesel engines may be made either upon the pressure discharge to the Day tank or by gravity flow to the engine.

Some advantages claimed for the filter are:

(1) Large volume capacity;

(2) Absolute purity of the fuel, insuring freedom from a scored injector pump or clogged nozzle jet;

(3) Low cost of initial investment and long filter tube life before replacement at cost of only a few cents;

(4) Elements having a size and density for any type of fuel and for any size of diesel engine;

(5) Filter tube replacement in less than one minute, simply by unscrewing the ring which attaches the shell to the filter body.

The manufacturers have also adapted this type of filter to the by-pass continuous flow purification of crankcase oils for internal combustion engines used in marine, automotive, and industrial service.

Essential parts of Ful-Flo oil filter and assembly.

Distributor Appointed

The Toumey Electric and Engineering Company of San Francisco has recently been appointed Marine Distributor for Marvel Mystery Oil in the San Francisco district.

This lubricant is being marketed to the marine field with fine success on the East Coast.

Some of the characteristics that are claimed to be necessary in an oil of this nature are:

The film strength of the oil itself must be at least three times greater than current oils to be capable of standing up under thin layer lubrication—"Boundary Film Lubrication." Minute areas of bearing surfaces create extreme high pressures and depend on boundary film for protection against roughing of the surface. From the finest bearing to the removal of a rusty bolt, this film strength of the oil is essential.

Of prime importance is the ability of the oil to retain the strength properties so it will not separate out by distilling off under heat or by settling out when at rest.

It must be neutral to all metals used in a motor, especially the various alloys and mixtures of metals used in the perfecting of new bearing surfaces.

It must be capable of lubricating the cool intake valves of a motor, the hot upper cylinder walls, rings and pistons, and of keeping clean the extremely hot exhaust valves; also of neutralizing the corrosive effects of the by-products of combustion.

The pour point must be low, and the oil active at 60 or 70 degrees below zero, to blend completely with other oils and prohibit the formation of gum and varnish-like skin coatings on metal surfaces.

The oil must be capable of removing from the bearing surfaces a substance which cannot be seen but which can be easily measured by power loss when it is present. (It is present on practically all bearings after about 50 hours' running time.)

The oil must be a good cooling agent, and must easily gather the bearing heats and quickly give this heat off in the coolers. It must have low viscosity and low internal friction so that its own heat production may be kept at a minimum.

These and many other characteristics must be in and a part of the oil in order that it do its work properly.

Wages and Sling Loads

(Continued from Page 17)

When the following cargoes are leaking or sifting because of damage or faulty containers, a penalty of 10c per hour shall be paid; and total rate shall be:

Straight time, per hour	$1.05
Overtime, per hour	1.50

Analine Dyes

Fish Oil, whale oil and oriental oils, in drums, barrels or cases

Lamp black.

5. PENALTIES TO CERTAIN GANG MEMBERS:

To winchdrivers, hatchtenders, siderunners, burton men, donkey drivers, stowing machine drivers and boom men only:

Handling lumber and logs out of water

Straight time, per hour	$1.15
Overtime, per hour	1.60

To Boom men only:

Handling creosoted products out of water

Straight time, per hour	$1.25
Overtime, per hour	1.70

To Hold men only:

All paper and pulp in packages weighing 300 lbs. or over per package, only when winging up, and when stowing in fore peaks, after peaks and special compartments other than regular cargo spaces. (This does not apply to rolls)

Straight time, per hour	$1.05
Overtime, per hour	$1.50

To Hold Men only:

Head room: When there is less than 6 ft. of head room—

(a) Loading cargo in hold on top of bulk grain.

(b) Covering logs or piling with lumber products.

Straight time, per hour	$1.05
Overtime, per hour	1.50

6. PENALTIES FOR SPECIAL CONDITIONS:

Damaged cargo: Cargo badly damaged by fire, collision, springing a leak or stranding, for that part of cargo only which is in a badly damaged or offensive condition:

Straight time, per hour	$1.50
Overtime, per hour	1.50

Cargo damaged from causes other than those enumerated above, shall, if inspection warrants, pay the damaged cargo rate or such other rate as determined by the Labor Relations Committee for handling that part of the cargo only which is in a badly damaged or offensive condition.

Explosives: When working explosives, as defined by current Western Classification Rules, all men working ship and barge to receive:

Straight time, per hour	$1.40
Overtime, per hour	1.40

Fire: When fire is burning or cargo smouldering in a hatch, the gang working the hatch to receive:

Straight time, per hour	$2.10
Overtime, per hour	2.10

Maxium Loads for Standard Commodities Pacific Coast Ports

Effective July 26, 1937

1. On and after July 26, 1937, at 8 o'clock in the morning, the maximum loads hereinafter specified shall be adopted for the commodities hereinafter referred to in all ports coming under the provisions of said agreement of February 4, 1937. After the effective date of this agreement all loads for commodities covered herein handled by longshoremen shall be of such size as the employer shall direct, within the maximum limits hereinafter specified, and no employer after such date shall direct and no longshoremen shall be required to handle loads in excess of those hereinafter stated. The following standard maximum sling loads are hereby adopted:

(1) CANNED GOODS

24-2½ talls, 6-12's talls and 48-1 talls (including salmon)	35 cases to sling load
or when loads are built of 3 tiers of 12	36 cases to sling load
24-1 talls	60 cases to sling load
24-2's talls	50 cases to sling load
6-10's talls	40 cases to sling load
Miscellaneous cans and jars	Maximum 2100 lbs.

(2) DRIED FRUITS AND RAISINS (GROSS WEIGHT)

22 to 31 lbs.	72 cases to sling load
32 to 39 lbs.	60 cases to sling load
40 to 50 lbs.	40 cases to sling load
24-2 lbs.	35 cases to sling load
48-15 oz.	40 cases to sling load

(3) FRESH FRUIT—Standard Boxes

Oranges	Standard, 27 boxes to sling load
Oranges	Maximum, 28 boxes to sling load
Apples and Pears	40 boxes to sling load

(4) MISCELLANEOUS PRODUCTS

Case oil—2 5-gal. cans (Hand hauled to or from ship's tackle)	18 cases to sling load
(Power hauled to or from ship's tackle)	24 cases to sling load
Cocoanut	12 cases to sling load
Tea—Standard	12 cases to sling load
Tea—small	16 cases to sling load
Copper (Large)	5 slabs to sling load
Copper (Small)	6 slabs to sling load
Copper (Bars)	9 bars to sling load
Cotton, under standard conditions	3 bales to sling load
Rubber (1 tier on sling) maximum of	10 bales to sling load
Gunnies, large	2 bales to sling load
Gunnies, medium	3 bales to sling load
Gunnies, small	4 bales to sling load

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Pacific Shipping and Port Notes

(Continued from page 32)

purchases from the Philippines. We are not, like Germany, bidding for needed commodities, but are attempting to hold a market while we penalize and restrict the only goods that we are willing to accept in payment. It appears that we shall have to retreat from the Philippine market for some categories of commodities, e.g. cheap manufactures and foodstuffs more economically produced elsewhere.

The fate of American investments in the Philippines is still to be seen. The national debt of the Islands, mostly owed to the U.S.A., is well secured by a first lien on Philippine revenues accruing during the second five years of the Independence maturation period. Private investments are in a different category and, broadly speaking, may be regarded as secure or insecure as the Philippines succeed or fail in diversifying and stabilizing their agriculture and industry. If the Philippines are unable to dispose profitably of their surplus coconuts and sugar, and if they are unable to diversify their industrial and agricultural production sufficiently and in time to escape the penalties of over-specialization, the ensuing economic dislocation will be severe and all investments there will be in a precarious position.

Two measures might be taken which would alleviate the present and prospective stress upon the Philippine economic structure. Legislation to ameliorate the effects of the Jones-Costigan and Revenue acts, and of some of the provisions of the Tydings-McDuffie act, would maintain the purchasing power of the islanders. A degree of tariff autonomy, secondly, would protect and foster island manufacturing industries. In short, a very gradual change in the former status of Philippine-U.S.A. trade relations, together with an opportunity to develop their domestic industries, would assure the economic stability of the Islands and the future of American interests.

[American Council, Institute of Pacific Relations.]

Big Ditch Busy

By F. H. Langworthy

Administrative Asst. Panama Canal Zone

An all-time peak in cargo passing through the Panama Canal from the Atlantic to the Pacific was reached during the fiscal year 1937, which ended June 30, while total cargo in both directions through the waterway was the highest since the fiscal year 1930.

The Atlantic to Pacific total for the year ending June 30, 1937, was 9,895,653 tons, which is 22,103 tons, or 0.2 per cent, more than the previous peak year of 1929, when cargo transiting in this direction (southbound) totaled 9,873,529 tons. The increase in southbound cargo during the year was due to a large measure to record scrap iron shipments from the United States to the Orient.

The bucket dredge Cascades working on the Washington shoal, Panama Canal.

Cargo shipments through the Canal from the Atlantic to the Pacific have increased steadily since the low mark of 4,507,070 in the fiscal year 1933. In 1934 the cargo tonnage was 6,162,649 tons, 7,529,721 in 1935, 8,249,899 in 1936, and 9,895,632 in the past fiscal year.

A comparison of cargo shipments through the Canal from the Atlantic to the Pacific for the past twelve years shows the previous peak years and the effect of the years of industrial depression:

ATLANTIC—PACIFIC

Fiscal Year	Cargo Tonnage	Total Traffic Cargo Tonnage
1937	9,895,632	28,108,375
1936	8,249,899	26,505,943
1935	7,529,721	25,309,527
1934	6,162,649	24,704,009
1933	4,507,070	18,161,165
1932	5,631,717	19,798,986
1931	6,670,718	25,065,283
1930	9,472,061	30,018,429
1929	9,873,529	30,647,768
1928	8,303,344	29,615,651
1927	8,576,474	27,733,555
1926	8,034,593	26,030,016

Ocean-going commercial vessels using the Panama Canal during the fiscal year 1937 totaled 5,387, an increase of only five over the fiscal year 1936, but the highest fiscal year total since 1930. Tolls on the ocean-going commercial ships amounted to $23,102,137.12, a decrease of 1.6 per cent over the fiscal year 1936.

The total of vessels using the Canal during the fiscal year 1937 has been exceeded only three times in the

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Maritime Social Security

By Guy T. Helvering
Commissioner of Internal Revenue

Every person employed in the marine manufacturing and shipping industries comes under the provisions of Title VIII of the Social Security Act, which imposes an income tax on the wages of every taxable individual and an excise tax on the pay roll of every employer of one or more. This tax is payable monthly at the office of the Collector of Internal Revenue. The present rate for employer and employee alike is one per cent of the taxable wages paid and received.

Under Title IX of the Act, employers of eight or more persons must pay an excise tax on their annual pay roll. This tax went into effect on January 1, 1936, and tax payments were due from the employers, and the employers alone, at the office of the Collector of Internal Revenue on the first of this year. This tax is payable annually, although the employer may elect to pay it in regular quarterly installments.

The employer is held responsible for the collection of his employee's tax under Title VIII, and is required to collect it when the wages are paid the employee, whether it be weekly or semi-monthly. Once the employer makes the one per cent deduction of Federal funds and pay, he becomes the custodian of Federal funds and must account for them to the Bureau of Internal Revenue.

This is done when the employer makes out Treasury form SS-1, which, accompanied by the employee-employer tax, is filed during the month directly following the month in which the taxes were collected. All tax payments must be made at the office of the Collector of Internal Revenue in the district in which the employer's place of business is located.

Penalties for delinquencies are levied against the employer, not the employee, and range from 5 per cent to 25 per cent of the tax due, depending on the period of delinquency. Criminal action may be taken against those who willfully refuse to pay their taxes.

SOCIAL SECURITY FEATURES

Actual money, when paid as wages, is not the sole basis on which the tax is levied. Goods, clothing, lodging, if a part of compensation for services, are wages and a fair and reasonable value must be arrived at and become subject to the tax.

Commissions on sales, bonuses and premiums on insurance are wages and taxable.

Officers of corporations whether or not receiving compensation are considered employees for the purpose of taxation.

Wages paid during sick leave or vacation, or at dismissal are taxable.

Traveling expenses required by salesmen are not wages if the salesmen account for, by receipts or otherwise, their reasonable expenditures. That part for which no accounting is made is construed as a wage and is taxable.

Exercise great care in filling out Treasury forms SS-1 and 940. Directions are easy to follow and correct returns mean no unnecessary delay.

The employers of one or more are also required to file Treasury forms SS-2 and SS-2a. Both are informational forms and must be filed at Collectors' offices not later than July 31, 1937, covering the first six months of the year. After that they are to be filed at regular quarterly intervals. Form SS-2 will show all the taxable wages paid to all employees and SS-2a the taxable wages paid each employee.

Participation in a state unemployment compensation fund, approved by the Social Security Board, does not exempt employers from the excise tax under Title IX, Commissioner Helvering said. Nor does the fact that

there is no state unemployment compensation fund relieve the employer of his Federal tax payments. In those states where an unemployment compensation fund has been approved, deductions up to 90 per cent of the Federal tax are allowed the employer who has already paid his state tax. These deductions are not allowed unless the state tax has been paid.

This tax is due in full from all employers in states having no approved fund. The rate for 1936 was one per cent of the total annual pay roll containing eight or more employees, and for 1937 it is two per cent. The rate increases to three per cent in 1938 when it reaches its maximum. The annual returns are made on Treasury form 940.

An employer who employs eight or more persons on each of twenty calendar days during a calendar year, each day being in a different calendar week, is liable to the tax. The same persons do not have to be employed during that period, nor do the hours of employment have to be the same.

Lloyd's Register of American Yachts, 1937

This hardy perennial, established by Lloyd's Register of Shipping in 1903, continues its regular increase in size, the new book listing 6209 yachts, as compared with 5701 last year. The color plates of flags include approximately 3000 private signals of yachtsmen and over 600 burgees of the yacht clubs of the United States and Canada.

The new entries run to a total of 514, including all classes of yachts, of which but little more than 12 per cent are purely sailing craft. This by no means indicates the disappearance of the sail, but on the other hand must be taken as evidence of the perfection of the modern internal combustion engine both in point of efficiency and light weight, making it possible to install an engine in every size and type of yacht. The growing number of cruising yachts all depend on auxiliary power.

This year the interest centers primarily on the new Ranger, built to defend the America's Cup; a wonderful structure of mild steel with special high tensile steel on the topsides. Her overall length greatly exceeds all previous defenders, running to 135 feet 2 inches. A departure has been made this year in including a yacht of foreign ownership with the American craft, the Endeavour II, presumably the challenger. In overall length she exceeds even Ranger, though by only eight inches. However, the waterline of the Endeavour II is 86 feet 7 inches, while that of the Ranger is 87 feet. The draft is necessarily the same; but the beam of Ranger, 20 feet 11 inches, is less by 8 inches than Endeavour II. Supplementing the entry of Endeavour II is that of her owner's new diesel yacht, Philante, which will serve as tender to the two Endeavours; 263 feet overall; 240 feet waterline; 38 feet beam and 14 feet 6 inches draft.

Next in point of size among the additions to the racing fleet is the 12-Metre Gleam, designed by Clinton H. Crane for his own use. The 8-Metre Class has but two additions, Yucca and Prelude, both built for the Pacific Coast, as the Class is weak in the East. The 6-Metre Class shows four new yachts, Lulu, Rebel, Circe and Light Scout.

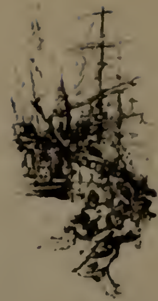
The Register is published annually at the end of May by Lloyd's Register of Shipping, 17 Battery Place, New York, the price being $12.00 for the canvas edition and $14.00 for the blue and gold edition.

Wandering Buoy Returns

Lighted buoy 1, which is stationed outside of Monroe, Mich., in the west end of Lake Erie, was carried out by the ice at the close of navigation last year and surprised the officers of the tenth lighthouse district by showing up again recently upon the opening of navigation in the vicinity of Dunkirk, N. Y., where it was recovered by the tender Cherry, uninjured except for the lantern, which had been torn off by the ice. The buoy had not only traveled over 200 miles but had threaded its way through the ice among the islands in the west end of Lake Erie with its 3,500-pound concrete mooring sinker attached. As a vessel officer pointed out, it exhibited an ability to avoid the shoals not found in some navigators. All that was necessary to restore it to service was replacement of the lantern and lantern gallery and renewal of the paint, which had been badly worn off during its winter voyage.

[U. S. Lighthouse Bulletin]

On the Ways—



SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

American Shipbuilding Doubles in Year

As of May 1, 1937, the American Bureau of Shipping reported as under construction in American commercial shipbuilding yards 218 vessels, with an aggregate gross tonnage of 310,051. These figures are exclusive of naval fighting craft, but include some Government ships, such as lighthouse tenders, dredges, lightships, towboats, and derrick barges.

The totals may be compared with those of May 1, 1936, which show 138 vessels, aggregating 162,000 tons, or an increase of over 90 per cent for the year.

When considering the prospects for the American shipbuilder, bear in mind that none of these vessels are being built under a shipbuilding subsidy. The U. S. Maritime Commission building program under the Shipbuilding Subsidy Section of the Merchant Marine Act of 1936 has not yet started.

Federal Launches Tanker

Hull 143, first of a group of four 12,800-ton tankers building at Federal Shipbuilding and Dry Dock Company for the Standard Oil Company of New Jersey, was launched July 24 and christened with the euphonious name of Esso Bayonne. Her keel was laid December 16, 1936. She was built on the Isherwood bracketless longitudinal system of framing and to the Isherwood arcform design. This ship and her three sisters will be of the same general

Tanker Esso Bayonne

characteristics as the R. P. Resor and T. C. McCobb, built in the Federal yard and delivered to Standard Oil Company of New Jersey last summer. Water tube boilers delivering high pressure steam to geared turbines will comprise the power plant.

Keel for Hull No. 144 was laid February 8, 1937. Keel for Hull No. 145 will be laid immediately on the ways made vacant by the launch of Esso Bayonne, and keel for Hull No. 146 will follow launch of Hull No. 144, which is scheduled in the near future.

Associated Orders New Tanker

On July 14 Tide Water Associated Oil Company awarded a contract to the Sun Shipbuilding and Dry Dock Company of Chester, Pa., for the construction of an all-service oil tanker to be used in the Pacific coastwise and offshore trades by the Associated Division, with headquarters in San Francisco.

This vessel will be of the most modern design and equipment. Built on the Isherwood bracketless type of construction, she will follow the recent practice of saving weight in the steel frame by welding and placing part of this weight in the side plating in way of tank spaces to offset corrosion. She is to be delivered in July, 1938.

Her principal characteristics are:

Overall length	462 feet
B. P. length	442 feet
Beam molded	65 feet
Depth molded	35 feet
Speed	13 knots
Deadweight capacity, 12,800 tons	

She will carry 102,000 barrels of gasoline, with 5,000 barrels of bunker fuel aft and 1,500 barrels forward, 235 tons of water aft in deep tanks, and 50 tons of stores, and crew.

Dredge Launched at Bethlehem

On July 28 the Union Plant of the Bethlehem Shipbuilding Company Ltd. (old Union Iron Works), San Francisco, was the scene of an interesting launching, when the hull of the hopper dredge Pacific slid down the ways. This vessel and her equipment were fully described in the July issue of Pacific Marine Review.

She is of shallow draft model, designed especially for work on bar channels at various Pacific Coast harbors, and has the following general characteristics:

Length of hull	180 ft. 3 in.
Beam molded	38 ft. 0 in.
Depth molded	14 ft. 0 in.
Draft light for'd	4 ft. 8 in.

Draft light aft	7 ft. 8 in.
Draft loaded	10 ft. 10 in.
Speed loaded	9 knots

For propulsion power she has twin screws, each driven by a 400 H.P. Winton diesel through a hydraulic coupling. For the dredging pump a 400 H. P. Winton diesel directly connected to a 275 K.W. General Electric direct current generator, supplemented by either or both of two 75 K.W. auxiliary diesel driven generating sets, supplies sufficient power so that the pump motor can work continuously at 425 H.P. if necessary.

The dredge Pacific is expected to be ready for her trial trip late in August.

Dredge Pacific was designed in the San Francisco office of the U. S. Army Engineers under the personal supervision of Principal Engineer F. C. Scheffauer, assisted by Senior Engineer H. D. G. Baxter and Associate Naval Architect H. A. Lennon. She embodies the knowledge gained in many years of experience in dredging safe channels through the bars of Pacific Coast harbors.

Pusey and Jones Launch Mine Planter

Christened by Mrs. Malin Craig, wife of the Chief of Staff, U. S. Army, the Ellery W. Niles, a diesel electric mine planter and cable layer for the Coast Artillery Corps, U. S. Army, slid down the ways into the Christiana River at the historic Pusey and Jones Shipyard, Wilmington, Delaware, on June 22.

This vessel is to be used in planting harbor defense mines and laying the cable for their detonation from shore stations. Her power plant consists of three 550 H. P., fresh water cooled, six cylinder Winton diesels, each direct connected to a 300 K.W. D. C. Westinghouse generator. The twin screws are each driven directly by a Westinghouse D.C. motor capable of developing 560 H.P. at 230 r.p.m. Kingsbury bearings take the thrust of the screws.

All auxiliary machinery is electrically operated. The entire hull is steel, insulated in exposed quarters by sheet cork. All living quarters

Launching of Ellery W. Niles.

are air conditioned. All applications of power, including the propulsion of the ship, are subject to distant control from the bridge and other points to an extent never before installed on a sea-going craft.

On the Ellery W. Niles the steering gear and deck machinery were supplied by Lidgerwood, the majority of the pumps by Worthington, the oil purifiers by Sharples, the gyro-compass equipment by Sperry, and the echo depth finders by Fathometer.

Orders from the bridge are transmitted through a Guided Radio loud speaker system, which provides 16 stations simultaneous or individual broadcasting or for two way voice communication.

She will have accommodations for a personnel of 45, and will be capable of 13½ knots speed. Her design was developed by Edward A. Hodge, Naval Architect, New York.

Contract for New Ferry

The Maryland Dry Dock Company of Baltimore, Md., was very recently awarded a contract for the construction of a double ended steel hull ferry by the Clairborne-Annapolis Ferry Company. This boat will be 208 feet by 62 feet by 9 feet, and is to be delivered in May, 1938.

Construction Starts on New Bulk Freighters

The American Shipbuilding Company at their Cleveland yard laid down on June 21 and July 6 the keels for two large bulk freighters contracted for by the Pittsburgh Steamship Company. These vessels will be 610 feet long, 60 feet beam, 32 feet 6 inches molded depth. Each will be driven by a 2,000 H. P. geared steam turbine power plant taking steam at 400 lbs. pressure from water tube boilers. All auxiliaries will be electrically operated.

Portland Firm Gets Feltre Repairs

The Italian motorship Feltre sank in the Columbia River on February 19 last after collision with the American steamer Edward Luckenbach. On examination, the hole in her side proved to be 250 feet long. By a very clever bit of salvage work she was raised and floated to Portland and dry dock. After considerable bickering over claims and counter claims she was libeled and sold at auction by the U. S. marshal to Pacific American Fisheries for $55,000, which, so far as liens on the ship were concerned, had to cover claims aggregating over $250,000. Bids for her repairs taken previous to her sale had shown Albina Engine and Machine Works, Portland, to be the low bidder at $328,157 cost and 110 days' time.

The Pacific American Fisheries have given the contract for repairs to the Portland firm. Undoubtedly she will be changed to American registry.

As will be noted from the illustration on the facing page, this job is a major piece of repair work. All frames, bulkheads, and shell plating for over half of the length of the Feltre will have to be either replaced by new material or faired up, reriveted or welded and refinished. All machinery will have to be overhauled and put in good condition, and the great bulk of this work will have to be done while the ship is in drydock.

Two More Tankers for Pan-Petroleum

As we go to press comes word from ie Pan-American Petroleum and ransport Company of New York at they have placed an order with ie Federal Shipbuilding and Dry ock Company of Kearney, New Jer y, for two bulk oil tankers to be ilt along the same general lines as ie four tankers now building at that ant for the Standard Oil Company f New Jersey. This would make ese tankers of the same Isherwood rcform design as the Esso Bay ne, launched by Federal on July 24. This ship is of 12,800 tons dead-eight capacity, has a length of 445 et, a beam of 66 feet 6 inches, a aded draft of 28 feet, and is in gen-al the same type and size of hull the R. P. Resor and the T. C. Mc-obb, which were completely de-ribed in Pacific Marine Review for nuary, 1936.

The addition of these two tankers ves the Federal yard six tankers d six destroyers, which should ep them quite busy for some onths to come.

reighter Converted to Tanker

The Craig Shipbuilding Company of Long Beach, California, are busily engaged in converting a freighter to a tanker. The vessel undergoing this transformation is the motorship Mazatlan. Built by the Long Beach Shipbuilding Company in 1920 as a steel hull shallow draft cargo carrier for the California and Mexico S. S. Company Inc., this vessel is 164.3 feet long, 34.1 feet beam, and 17.8 feet deep. She was fitted with twin screws, each screw being driven by a 350 brake horsepower diesel engine. She should make an ideal tanker for short coastwise runs and harbor work.

Campbell Gets Tuna Boat Contract

The Campbell Machine Company of San Diego, Calif., was recently awarded by the Van Camp Sea Food Company of Terminal Island, Calif., a contract for the construction of a 139 foot tuna fishing boat. This vessel will be equipped with a six cylinder, 600 horsepower Union diesel engine for propulsion, and with two 140 horsepower Union diesels, each driving a 100 K.W. General Electric generator, to furnish power for auxiliary machinery and lighting. Two 12 inch pumps will be installed for circulating water through her live bait tanks. Large refrigerating capacity will be provided to take care of her fish catch on the way home from distant banks.

New York to Build $1,000,000 Fireboat

Bids were received by the City of New York on July 28 for the construction of a super fireboat. Specifications call for an all steel hull built to the highest classification of the American Bureau of Shipping. She will be 134 feet long, 32 feet molded beam, 13 feet 3 inches molded depth, and 9 feet loaded draft. She will be propelled by diesel electric drive on two screws, with a total developed propulsion horsepower of 2,000 at 425 r.p.m., and a speed of 16½ knots on loaded draft. She was designed by Gibbs and Cox Inc., New York naval architects.

Included in the equipment is a two way radio and a special loud speaker system, so that orders from the bridge may be plainly heard in any part of the ship. Her collapsible water tower will have a maximum height of 45 feet above the waterline. Her crew will work and live in air conditioned quarters. Her interior will be protected against fire by a CO_2 system. She will carry concrete smashing equipment to break through concrete floors on docks. Her bow plating will be strongly reinforced to enable her to break through ice floes on the river.

Eight water "guns" are to be carried on pedestals on the deck. The bow water "gun" is designed for a 6,000 gallon per minute capacity, and will be the most powerful afloat.

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1937 Metal Congress

The 1937 Metal Congress and Exposition will be held from October 18-22, inclusive, in Atlantic City Auditorium, according to announcement made by W. H. Eisenman, managing director of this annual Metal Show and national secretary of the American Society for Metals, after a meeting of the Society's board of trustees in this city.

This important metal event has been staged and sponsored for eighteen successive years by the American Society for Metals. It is one of the oldest and most popular industrial expositions in the country.

teresting view of motorship Feltre in dock at Portland, showing tremendous hole in her hull.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401)**; completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341′ 3⅝″; beam, 35′ 6⅛″; depth, 19′ 8″. Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; **launched July 28, 1937.**

DRYDOCK AND ROUTINE REPAIRS: **Tug, W. B. Storey, District of Columbia, Admiral Watson, Manini, W. S. Miller, Mariposa, W. S. Rheem, Frank G. Drum, Makaweli, Hollywood.**

FELLOWS AND STEWART, INC.
Wilmington, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Yachts Retreat, Vellron, Gitana, and Nuova Del Mar; Cannery vessel North Cape; 62 smaller yachts and motorboats.**

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Kewanee, Admiral Halstead, Lumberman, W. R. Chamberlin, Jr., Derrick Barge No. 34, Elna, Horace Luckenbach, Gas S. Contra Costa, Tug Arabs, Barge No. 4, Siskiyou, Solano, Korn, American Fisher, Malama, Noyo, Stanwood, Barge 1923, Barge No. 9, Lake Miraflores.**

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80′ U. S. Coast Guard patrol boats; 1,600 H.P. each;** Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; **estimated launching dates August 10,** September 1, September 15, and October 1, 1937; expected completion dates September to October, 1937.

Two **78′x20′x9′6″ Lamparo** fishing boats; one for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; second for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. Delivery date October, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: **Steel Trader, M.S. Hawaiian Standard, M.S. Ward, President Harrison.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

NEW CONSTRUCTION: **120′ steel tuna vessel;** 600 H.P. Enterprise diesel engine; delivery date September 15, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Yacht Aquillo, Barge U. O. Co. 1920, Seattle, U. S. Boxer.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: **F/B Chicken of the Sea, Edwin B. DeGolia, Cabrillo, F/B Minato Maru, Homer, Tug D. M. Renton, Tug D. P. Fleming, Launch Betty O, Tug Listo, Tug Vivo, La Placentia, L. A. Fireboat No. 2, M.V. Minowo Maru, M.V. Velma, La Purisima, Eagle, Eureka.**

MARE ISLAND NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley,** Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937; estimated delivery October, 1937.

Pompano, Submarine (SS181); keel laid January 14, 1936; launching date, March 11, 1937; estimated delivery, October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: **Aylwin, Dale, Farragut, MacDonough, Monaghan, Detroit, Houston, Algorma, Pinola, Vireo, Bridge, Gannet, Dobbin, Wright.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Balboa, Columbian, Transport Meigs, H. T. Harper, Adellen, Davenport, Arizonan, Redwood, San Bernardino, Transport Republic, Golden Coast Dakotan, Coloradan, Esther Johnson Pres. Adams, West Nilus, Ohioan, Cutter 401, Golden Cross, Beulah, Dintledyk, Carriso, Pres. Harrison, Baillache**

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: 16 fishing boats; 10 scows; 4? ship repair jobs not requiring docking; 50 commercial jobs.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; estimated completion date, November 1 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Arizona, Pennsylvania, Saratoga, New Orleans.**

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Stephens 36, 36′ x 9′ 10″ x 2′ 4″; powered by Twin Gray "Six-71's." Launched March 22, 1937.

Alicita, 36′ x 9′ 10″ x 2′ 4″; powered by Twin Gray "Six-71's." Launched April 4, 1937. Owner, J. V. Carson, Hollywood.

Dalida II, 36′ x 9′ 10″ x 2′ 4″; powered by Twin Gray "Six-71's." Launched April 11, 1937. Owner, D. A. Lord, San Francisco.

Irma Lou II, 36′ x 9′ 10″ x 2′ 4″; powered by Twin Gray "Six-71's." Launched May 26, 1937. Owner, Louis C. Boone, San Francisco.

One 29′ sport fishing cruiser (special) for J. C. Axelson, Los Angeles; powered by twin Lycomings "Six-85."

Nine standard stock 29's.

Six standard stock 36's.

Ruth K, 29' 2" x 9' x 2' 4"; powered by Gray "Six-51." Owner, Elmer Gumpert, Stockton. Launched April 17, 1937.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS **President Jefferson, Edgar F. Luckenbach, Dorothy Alexander, Point Vincente, North Haven.**

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION: **Hull No. 127, Yankee Clipper**; purse seiner, 82' x 20'; 200 H.P. Atlas engine; keel laid May 26, 1937; launched July 22, 1937. Owners, Ed. & J. Kaseroff and E. Manaan, of San Pedro, Calif.

Hull No. 128, Santa Lucia, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 15, 1937; delivery date September, 1937 Owner, Frank Cardinale.

Hull No. 129, purse seine fishing boat; 78' x 20', powered by 200 H.P. Atlas engine. Keel laid July 19; delivery date, October, 1937. Owner, Roy Hugly, Seattle.

DRYDOCK AND ROUTINE REPAIRS: **Fishing boat Western Traveler; Clipper Wanderer, Tacoma & Pierce; yacht Carmelita; tug Betty Earls.**

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION:

One oil barge, 145' x 26' x 7' 4" for Standard Oil Co. of Ohio; completion date August 1, 1937.

One floating fender, 200' x 7' x 3½', for National Tube Co.; completion date August 1, 1937.

DRYDOCK AND ROUTINE REPAIRS: 9 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Two bulk lake freighters** 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Keels laid June 21, 1937; and July 6, 1937; launching date October, 1937; delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis** and **DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively. **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 175, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, September 1, 1937.

Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass, owners; estimated delivery, September 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; launched February 25, 1937; estimated delivery, August, 1937.

CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; estimated launching date August, 1937; estimated delivery, February, 1938.

Annapolis, West Point, Yale; three diesel drive trawlers for General Sea Foods. Estimated delivery October, 1937.

Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil tankers**—steam—425'x64'x34' for Gulf Oil Corp.; total tonnage 7070 each.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

One barge for Socony-Vacuum Oil Co., Inc.; 260 feet long; non-propelled. Estimated delivery date October, 1937.

BOSTON NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; launching date February 1, 1938; estimated delivery indefinite.

Order placed for **DD415, O'Brien**, and **DD416, Walke**, two destroyers; delivery dates, August, 1939, and October, 1939, respectively.

One large harbor tug for U. S. Navy, delivery date 1938

BROOKLYN NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn**, light cruiser. L.B P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu**, light cruiser; L.B P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935; launching date August 16, 1937; estimated delivery, May 1, 1938.

CL 50, **Helena**, light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

IRA S. BUSHEY & SONS, INC.
Foot of Conrt Street
Brooklyn, New York

NEW CONSTRUCTION: **Two 76' all-welded diesel towboats** of 550 H. P each, for private parties. Delivery dates August 1, 1937 and September 1, 1937.

CHARLESTON, S. C., NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for one **harbor tug**; LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Two trawlers** for the Portland Trawling Company; 146'6'x25'x14'2".

DRYDOCK AND ROUTINE REPAIRS: **Minerva, Launch Eva May, Tug Cecilia, Yachts Polaris and Osprey, Lighthouse Tender Cypress, Tug Barrenfork, Launch Louise, Yacht Romiltek, Fishing Boats Francis G. and Tartar, Tug Juno, Floridian, Fishing Boat Jackie, Barge Arrow.**

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City

Three 30' play boats for stock.

One 42' play boat for stock.

One 50' cruiser, 2 Lathrops; delivery date, August 1, 1937.

One 57' cruiser; delivery date September 15, 1937.

One 20' runabout.

One 50' cruiser, 2 MC Speedways; delivery date August 1, 1937.

One 42' play boat, 2 Chrysler Royals; delivery date August 1, 1937.

One 80' diesel cruiser; delivery date autumn, 1937.

One 45' cruiser; estimated delivery date September 1, 1937.

One 30' launch, one Kermath; delivery date August 31, 1937.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One lighthouse tender, Elm, 72′ 4″ x 17′ 0″ x 6′ 6″, for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

One diesel yacht, powered by 1,000 h.p. Winton engines; 143′ long, 23′ beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997,** one diesel sternwheel towboat of 91 gross tons.

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100′x26′ x6′6″; 320 gross tons.

Hull No. 1374, one welded flush deck cargo box barge 130′ x 34′ x 10′, for Warner Equipment Co., Philadelphia, Penn.; 452 gross tons.

Hulls Nos. 1378 and 1384; two welded steel deck barges 80′ x 30′ x 9′, for Pennsylvania Railroad, Philadelphia, Penn.; 354 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Shipping Company; 600 gross tons.

Hulls Nos. 1416 and 1419-1424, inclusive; seven welded type W-3 coal barges 175′ x 26′ x 10′ 8″; for stock; 3204 gross tons.

Hull No. 1425; one welded steel fuel flat 110′ x 24′ x 9′; for Union Barge Line Corp.; 200 gross tons.

Hull No. 1426; one welded steel fuel flat 80′ x 18′ x 6′; for Union Barge Line Corp.; 65 gross tons.

Hulls Nos. 1427-1428, inclusive; two welded steel covered lighters 110′ x 33′ x 9′ 6″; for Reading Co., Philadelphia, Pa.; 1120 gross tons.

This makes a total of 21 hulls with a total gross tonnage of 6836 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936; launching date August 25, 1937.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October 22, 1937.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937.

Hull No. 30, Saury (SS189); keel laid June 28, 1937.

Hull No. 31, Spearfish (SS190); estimated keel laying date September 9, 1937.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, **DD381 Somers and DD383 Warrington; keels laid June 27,** 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, **DD397 Benham, DD398 Ellet and DD399 Lang,** estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing. Hull 143, Esso Bayonne, keel laid December 16, 1936; launched July 24, 1937. Hull 144, keel laid February 8, 1937.

Two destroyers, **DD411 and DD412.**

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8′. Probable launching date September 21; delivery date, approximately Oct. 15.

One steel vegetable oil barge for New York Tank Barge Co., N.Y.; 650 tons gross; capacity 1250 tons; 195 x 42 x 12. Estimated launching date September 1, 1937; estimated delivery date September 25, 1937.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all-welded steel diesel tugboat; 74′ long, beam 19′, depth 9′; equipped with 380 H.P. Atlas Imperial engine; for Higman Towing Co., Orange, Texas. Delivery date, August, 1937.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank** steamer, 465′x55′x28′, for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,-700,000 gallons of oil. Estimated launching date, August, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION:

Three all welded steel oil barges 175′ x 35′ x 8′ 6″, for Standard Oil Co. of New Jersey; to be used for service on Ohio and Mississippi Rivers; delivery date August, 1937.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: One double ended steel diesel ferry boat, 208′ x 62′ x 9′, for the Claiborne-Annapolis Ferry Company; delivery date May, 1938.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412 Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935 No. 412, launched May 8, 1937.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359 aircraft carrier CV5, Yorktown,** for U. S Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109′, beam 28′ depth 14′6″. Keels laid May 24, 1937.

PHILADELPHIA NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, **beam 61′ 9¾″, depth molded at side to main deck amidships 42′0 3/8″, draft corresponding to normal displacement 21′10″; standard displacement 10,000; estimated completion January 1, 1938.**

Order placed for **DD404,** 1500 ton destroyer; no dates set.

PORTSMOUTH, N. H., NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300′, beam 26′, loaded draft 15′7″; launching date August 24, 1937; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300′, beam 26′, loaded draft 15′7″; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302′6″, beam 26′10″, loaded draft 16′8″.

SS192, Squalus, submarine; contract period started December 1, 1936; L.B. P. 302′6″, beam 26′10″, loaded draft 16′8″.

Two submarines authorized in 1937; names or numbers not yet assigned.

(Page 64, Please)

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Fred Doelker Visits Agencies

Fred L. Doelker, Pacific Coast manager of Grace Line, sailed recently on the Santa Rosa for New York via the Spanish Americas, accompanied by Mrs. Doelker, their daughters, and their son. En route Doelker visited the line's agencies in Mexico and Central America. In New York he conferred with officials of the company before sailing for home.

Admiral Line Resignations

Resignation of three veteran Pacific Steamship Company (Admiral Line) executives, **Hugh B. Brittain**, passenger traffic manager; **Charles E. Perkes**, freight traffic manager; and **Charles E. Flye**, assistant freight traffic manager; was recently announced. They had been standing by for several months while the company's operations were at a standstill.

Charles Wheeler Addresses T. M's

In a talk before the Industrial Traffic Managers Association, **Charles L. Wheeler**, vice president and general manager of the McCormick Steamship Co., prophesied great gains for the U. S. merchant marine during the next few years under the new shipbuilding subsidy plan. He declared that a slight rise in the standard of living would result in more than a 100 per cent increase in world trade.

GRACE PACIFIC COAST MANAGER VISITS NEW YORK
Fred L. Doelker, Pacific Coast Manager of the Grace Line, shown aboard the Grace liner Santa Rosa as he arrived in New York July 13th, accompanied by his family for a short visit in the east. Left to right: Fred L. Jr., Mrs. Doelker, Florence Doelker, Mr. Doelker, Fredrika Doelker.
Photo courtesy Grace Line

Lisle McKim Receives Appointment with General

Appointment of **Lisle I. McKim** as Manager of Solicitation for the General Steamship Corporation, Ltd., was announced today by Harry S. Scott, President of the firm. Mr. McKim will succeed C. M. Covell, who recently resigned to assume the duties of Director of Transportation for the Golden Gate International Exposition.

Mr. McKim, who is leaving the position of Assistant Traffic Manager of the River Lines to assume his new duties, beginning August 1, brings to his new position a wealth of experience as well as a broad acquaintance with shippers throughout Northern California, coupled with a pleasing personality that has won him hundreds of friends.

He entered the transportation business in 1917 as a clerk in the Southern Pacific Company, where he served until 1922, when he turned to the Pacific Mail Steamship Co. for experience in the offshore business. Between 1924 and 1932 he was back again in railroading, serving as General Agent in Sacramento for the Sacramento Northern and Western Pacific. For the past five years he has been connected with the River Lines, both in Sacramento and San Francisco, first as General Freight and Passenger Agent and later as Assistant Traffic Manager.

Mackay Appointments Transfer Coast Men to New York

H. L. Rodman.

T. E. Nivison.

An announcement by **Admiral Luke McNamee**, President of Mackay Radio and Telegraph Company, states that **T. E. Nivison** and **H. L. Rodman**, general managers, have exchanged territories. Nivison moves to San Francisco in charge of Mackay Radio's operations on the Pacific Coast, and Rodman goes from San Francisco to New York to head up the company's Atlantic Division. Both have been principal leaders in the expansion and growth that Mackay Radio has had in domestic and international radio-telegraph service, but particularly in marine service on the Atlantic, the Pacific, the Great Lakes and the Gulf; and both learned the business as ship operators.

Nivison has been a telegraph operator all his life, starting to telegraph at the age of eleven. During the next five years he continued as a railroad operator, but in 1907, in the very earliest radio days, turned his skilled operating hand to radio on Great Lakes vessels and stations. In 1909 he was placed in charge of opening a station at Toledo for DeForest Radio. The following year he was radio operator on a transpacific routing, and then shifted to the Atlantic Coast, working for Marconi Wireless on Cape Cod. At this post he had the tragic distinction of being one of the operators to communicate with the sinking Titanic, and of handling distress traffic with the rescue ships Carpathia and California.

One year after operations were begun by Federal Telegraph, ancestor company of Mackay Radio on the Pacific Coast, Nivison joined as operator at Portland, Oregon. Then he shifted to commercial work at which he was at once successful. He went to Honolulu in 1914 as commercial agent and temporary manager of Mackay Radio's station there. He became manager at Portland and then manager at Los Angeles. In 1924 he was made sales manager and marine superintendent, the phase of the business for which his experience had prepared him exceptionally well. He was transferred to New York in 1926 in charge of marine operations on the Atlantic, the Great Lakes and the Gulf. He was made general superintendent of the Atlantic Division in 1929 and has led Mackay Radio into its present position in the East.

Rodman has been equally success-

W. V. Russ.

S. W. Fenton.

ul for Mackay Radio on the Pacific oast. He started in 1904 as a 'o tal Telegraph messenger at inghamton, N. Y., and was one of he early radio "bugs." He soon found job as ship operator and spent two ears at sea, then joined the Navy, ompleted the course in electricity d wireless at the U. S. Naval Elec-l School at Brooklyn, and served destroyers touching most parts t the world. In 1911, soon after Federal Telegraph Company arted operations, Rodman entered service and remained as an opera-r and in charge of various stations m Kansas City to Honolulu until he World War and his return to ser-e in the Navy. In charge of the pecial radio expedition that took ov r completed and operated the radio tion at Russian Island, Vladivos-k, Ensign Rodman was commended r the manner in which this assign-ent was carried through. He is now eutenant in the Naval Reserve, pecial Communication Branch.

After the war he returned to Fed-al Telegraph and entered the com-ercial end of the business, for hich a thorough operating back-round and a compelling personality tted him particularly well. He be-me marine superintendent, assist-t to the general manager, the late Y. Tuel; and finally general super-tendent of Mackay Radio's Pacific ivision, from which he moves to ew York as general manager of the tlantic Division.

W. V. Russ, Pacific Coast marine uperintendent for Mackay Radio & elegraph Company for the past two d one-half years, has been promot-d to the position of marine superin-endent of Atlantic Division with eadquarters in New York.

It is with interest that we review uss' history. He left the post of ssistant U. S. Radio Inspector at eattle to join the Federal Telegraph mpany in 1926. He devoted con-iderable time in broadcast receiv-ng equipment in the capacity of fac ry representative. He was with e Kolster Radio Corporation and d service with the Westinghouse lectric & Manufacturing Company. rior to service in the Department of ommerce radio inspection division uss was with the radio department f the United States Shipping Board and had previously served as radio operator at sea.

The Standard Oil Company of California launches the Despatch No. 7 at the Fulton yard, Antioch. Little Miss Lya Noel Rumsey was sponsor. In the launching party were Captain John Rumsey and his family (shown in illustration), Joseph McEachern, Charles Robertson, and other S. O. officials.
The towboat will be used in river and harbor barge towing service.

S. W. Fenton, who has served in both the operations and commercial departments of Mackay Radio's Marine Department, Atlantic Division, New York, since joining the organization in 1930, succeeds Russ in San Francisco as marine superintendent, Pacific Division.

Fenton has been connected with marine radio communications for the past 16 years. He served as chief radio officer on the maiden voyage of the United States Lines' Manhattan, then was assigned to shore duty at Mackay Radio's New York head quarters.

O'Donnell With United Engineering Co., Ltd.

Barney O'Donnell, one of the best known marine engineering and ship repair men on the Pacific Coast, is now with the firm of United Engineering Co., Ltd., engineers and machinists, and T. J. Moynihan Co., Ltd., boiler makers, headquarters, San Francisco. O'Donnell is assistant to R. E. Christy, who is manager and secretary-treasurer. H. P. Gray is president of both United Engineering Co., Ltd., and T. J. Moynihan Co., Ltd. Barney O'Donnell has been active in the San Francisco ship repair field for the past ten years.

Ed. Forrest Injured

We are mighty sorry Ed. Forrest, marine representative of The Paraf fine Companies, Inc., had the misfortune of breaking a leg recently. The accident occurred in Oakland and Ed was rushed to the Samuel Merritt Hospital where he is now recovering and in much better shape. Can't keep a good man down, so Ed's friends will see him up and at 'em again before long.

Captain H. D. Clarke Retires after 38 Years Service

In ships and ports around the world friends of Captain Harry David Clarke will be interested to learn of his recent retirement following 38 years of service. Captain Clarke was Port Captain and Manager of the Marine Department at San Francisco for General Petroleum Corporation of California, a subsidiary of Socony-Vacuum Corporation.

Born in London in 1880 Captain Clarke started apprenticeship in the full rigged ship Ardnamurchan, this vessel a frequent caller at San Francisco. She was owned by Hugh Hogarth & Son. In 1899 young Clarke joined the Standard Oil Company of New York, serving as second mate and chief officer in the four masted barks Eclipse and Arrow in the Atlantic, Pacific and East Indies trade.

Next we find him in the steamers Lackawanna, Chesapeake, Delaware and Narraganset. At the age of 25 he became master of the steamer Tanawanda. From 1906 to 1913 Captain Clarke was in Pacific service between California and Oriental ports. Cargo vessels were scarce. It was necessary for tank ships to go out with oil; clean the entire ship, and come home with general cargo.

During the World War Captain Clarke commanded oil transports under jurisdiction of the British Navy. Later we find our friend commanding various Socony vessels again. In 1924 he came ashore as Port Captain at San Pedro, California. In 1926 when General Petroleum was merged with Standard Oil of New York Captain Clarke was transferred to San Francisco as Port Captain and Manager of the G-P Marine Department. From this post he retired to a deserved rest.

Capt. H. D. Clarke.

Captain E. M. Olson, of the Matson Line's Golden Bear, with his officers and crew, was the honor guest at a luncheon given by the San Francisco Junior Chamber of Commerce and the San Francisco Commercial Club the latter part of July.

L. M. Caldwell, assistant vice president Fireman's Fund and Occidental indemnity companies, has returned to the companies' head office in San Francisco from a week's business trip in Southern California.

Back piloting a passenger ship across the Atlantic, **Captain Harry Manning** of the United States Lines, who piloted Amelia Earhart to Honolulu on her first round the world attempt, is commanding the U. S. Liner American Merchant to the British Isles.

David P. Henderson, former assistant to **Captain Kirkwood H. Donavin** during the latter's post of operating manager for the Panama Pacific Line, passed away at the Mare Island Hospital on July 21. He was buried in the National Cemetery at the Presidio. He was an ex-army man and was very well liked by all with whom he came in contact.

When the American Legion party visits Europe in September, the official escort will be **James Anderson,** assistant controller of the United States Lines, with headquarters at New York. Congratulations are being sent by Western legionnaires on his appointment. The party will sail from New York on the Washington, flagship of the pilgrimage. Anderson, an important member of the Roosevelt-U. S. Lines Post 945 of the American Legion, served at sea during the World War.

Propeller Club of California News of the Mont[h]

The vacation period will soon [be] over and Propellers can anticip[ate] some happy reunions with th[e] "shipmates" aboard the good s[hip] when we shove off on the fall v[oy]age.

The Board of Governors will s[oon] determine the sailing date and [an]nouncements will go out to the cr[ew] list ahead of the first big event.

Speaking of vacations . . . some [of] our good friends are already b[ack] with wild tales, snapshots and s[un]burn. Harold Weule and How[ard] Dunbar got all the way over to [Mi]ami, Florida. They stalked tarpon [on] the coast and 'gators in the glac[es], returning to their California hor[ne] by plane and reporting a most [en]joyable voyage.

Stanley Allen, our secretary, [re]ports the continuance of memb[er]ship committee activity despite [the] summer "holiday." New names [on] the roster are:

- Captain J. S. Smith, S.S. Genera[l] Pershing
- Captain G. E. Lindley, S.S. J. A. Moffett
- Captain Ralph Stall, S.S. W. S. Rheem.

Welcome aboard, skippers!

Again we remind our golfing me[m]bers of the fall tournament. Det[ails] of time and place will be announ[ced] real soon now.

Captain Girvin B. Wait, forme[r] assistant manager for Alexander [&] Baldwin, Ltd., at Seattle, Northw[est] agent for Matson Navigation Co[m]pany, has been appointed manager [of] Kauai Terminals, Inc., at Port All[en], T. H. He is president of the Propel[ler] Club, port of Seattle; was chairm[an] of the Foreign Trade Week and N[a]tional Maritime Day committee [in] 1936; and was chairman of the 19[..] Steamship Dinner committee. Ca[p]tain Wait has long been a leader [in] port affairs. He succeeds Capt[ain] **Lewis J. Hall,** retired.

The Wireless Era

Thirty Years of Development in the Ether Lanes Over the Seven Seas

The other day that dapper old sea dog and former editor of Pacific Marine Review, Captain Emil Francke, dropped into our office for a chat. Said he, "I hope that so influential a journal as Pacific Marine Review is surely going to publish an editorial tribute to my dear friend Signor Marconi."

We assured the captain that we had that idea in mind.

"In that event," said he, "may I supply some personal reminiscences of contacts with that great genius and of the early days of wireless?"

We expressed our welcome to this suggestion, and settled down to listen attentively to an interesting yarn.

Just after the Spanish War, 1899-1900, Emil Francke was first mate of the crack American trans-atlantic liner St. Paul, then making regular six-day crossings between New York and Southampton. One sailing day in New York there came aboard a slight, dark, soft-spoken young man with a large, heavy black bag. He presented a letter to Captain Jamison and asked to have the privilege of using the smoking room for some important experiments. Granted this permission, he proceeded to set up a small box with a lot of curious gadgets attached, which greatly excited the curiosity of everyone who saw it.

The gentleman turned out to be Signor Marconi, who had been in New York introducing the idea of wireless to a few American engineers and scientists and forming the first wireless company on this continent. When about seven miles out from New York he established communication with the wireless set he had left there in charge of one of his men and held this connection for some time, much to the amazement of passengers and officers alike.

The genial gentlemanly scientist became very friendly with the ship's officers, who rendered him every assistance in their power. A year or two later, when the St. Paul became the first passenger vessel to be equipped with wireless, these officers were granted the privilege of 100 words free each voyage for their own personal wireless messages.

In 1905, when Jim Hill was building the world's largest cargo carriers, Minnesota and Dakota, Emil Francke determined that he ought to be captain of one of these ships.

The ships were building at New London, Connecticut, with C. C. Lacey, as owner's representative, superintending construction. Francke wirelessed to Mr. Lacey an invitation to have lunch with him on the St. Paul during the lay over of that vessel in New York. On arrival he found waiting for him a letter from Lacey explaining the impossibility of leaving New London just then and expressing very effectively the honor that Captain Francke had conferred upon him by making him the first United States citizen ever invited to lunch by wireless. Said he, "I have that wireless message framed and hanging on the wall above my desk."

Emil Francke secured the desired berth and became captain of the Dakota. On taking command he requested Lacey to install a wireless set and Lacey explained that he would be highly in favor of such an installation, but, said he, "It would be practically useless. There are as yet no wireless stations shoreside on either side of the Pacific Ocean."

All of this is very interesting, as indicating the fact that the entire history of radio as we know it today is encompassed by the past 30 years. Marconi's pioneer work had been done prior to that period, but he and many others perfected the present system entirely within the span of the 30 years just passed.

And what a marvelous 30 years that has been in engineering and scientific progress and attainment, not only in wireless but in every department of human endeavor!

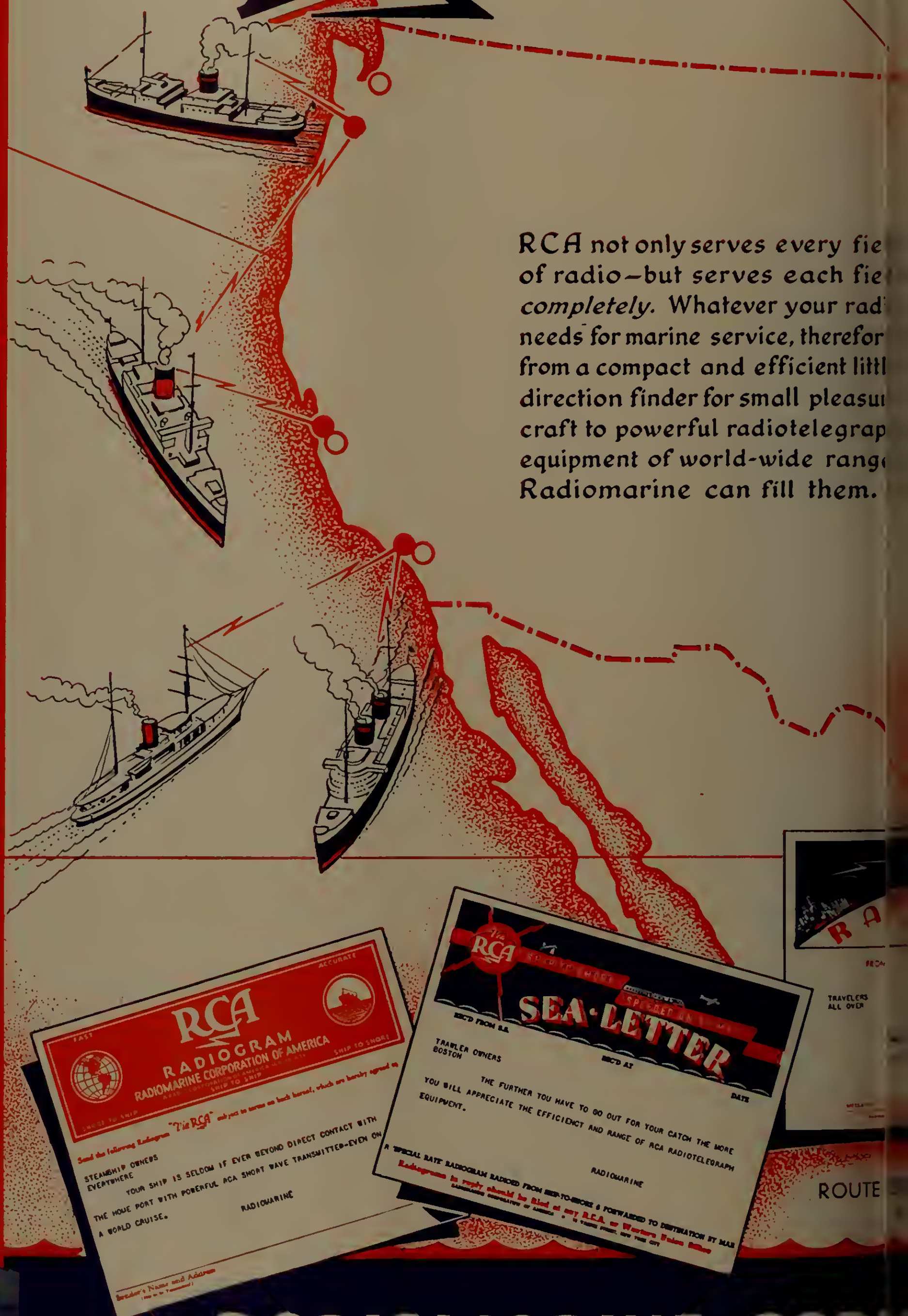
In the merchant marine this period has seen more progress than the whole of its prior history. The development of the turbine, the diesel engine, the era of high pressure steam, gyroscopic steering and stabilization, streamlining of hulls, echo sounding devices, electric drives for auxiliary machinery, and the burning of oil fuel under boilers, all parallel the development of radio.

Today every seagoing ship of importance carries radio apparatus. The majority of new passenger vessels are equipped not only with wireless telegraphy sets that are capable of keeping them in touch

Intermediate Frequency 50 Watt Transmitter

Yacht Direction Finder

RCA Al



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from a compact and efficient littl
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ALL COASTS
THE NEW RCA DIRECTION FINDER-MADE ESPECIALLY FOR YOUR USE-WILL GUIDE YOU HOME IN A BEE-LINE WHEN OTHER MEANS ARE UNCERTAIN.
RADIOMARINE
RCA
RADIOGRAM
FREIGHTSHIP AND TANKER OWNERS
EVERY PORT
THE EFFICIENCY OF RCA EQUIPMENT INSURES QUICK AND CERTAIN COMMUNICATION-THEREFORE UTMOST FLEXIBILITY OF CONTROL OVER COSTLY CARGOES.
RADIOMARINE
FT
ELEGRAMS
TION OF AMERICA
AMERICA SERVICE

with all communication networks ashore, but also with radio receiving sets and loud speakers that enable passengers to tune in on all the best broadcasting programs.

These ships print their own newspapers with up-to-the-minute news obtained through radio. They operate their own stockboards with instantaneous quotations over radio. They get instantaneous bearings from lighthouses that enable their officers to spot the location in the heaviest weather as accurately as if they were "shooting the sun."

In fact, radio has contributed more than any other one factor to the relative safety and comfort of passengers at sea on the modern ship as compared with the ships of 30 years back. In fact it is almost impossible for the modern tourist aboard a modern ship to conceive of the tremendous adventure that constituted a sea voyage in the days before radio, when no word of any kind came from a ship after she was out of sight of her port of departure until she arrived at her next port of call.

Many old seafarers will say that it is radio that has taken the romance out of shipping. In the old days the lads just home from a long voyage had wonderful tales to tell of strange, far away places and stranger folk. Today anything out of the ordinary that the lads do or find in the most out of the way spots on this planet is broadcast to the world almost before it happens.

However, radio too has its romance, and is building up for itself a great body of tales of adventure and achievement in the ether lanes that is even more alluring than the old romance of the sea to many of our finest modern youth.

Consider for a moment the value of radio to some of the auxiliary services to the merchant marine.

The Coast Guard service regard radio today as one of their most useful tools. By radio communication the Coast Guard cutters are called to all sorts of emergency tasks; keep all vessels advised of dangerous bergs or floes from their stations on ice patrol duty; keep in touch with their home base for orders; receive news from home or transmit messages there; and coordinate all their joint efforts in searching for and capturing or destroying enemies of or obstructions to legitimate maritime commerce.

Weather bureaus today get hourly reports by radio from planes in the air and vessels at sea. This enables them to accurately analyze and forecast meteorological conditions. They send out by radio reports of this work which often warn vessels at sea of dangerous storms that are avoidable by changes in the route or course.

To lightship crews and to lighthouse keepers radio is a life saver. Their vigils need no longer be lonely. They are in contact with the world afloat and ashore.

The shipmaster at sea need not any longer worry about the correctness of his chronometer, since the daily time signals carry to him by radio many indications of correct time in many locations.

Many of the towboat services of the world's ports are now directed by wireless telegraphy, saving precious time not only for the tugs but often also for the large vessels that they serve.

Pilot services are coordinated and simplified by radio, so that in the majority of the world's great ports there need be no delays waiting for a pilot.

Repairs and drydocking are arranged for in advance by radio when emergencies theaten to disrupt schedules.

Facsimilies of important documents may be transmitted by radio to a ship's officers, to consignees of a ship's cargo, or to representatives of ship's passengers, after her departure and before her arrival.

In all these ways, and others too numerous to be given special mention, radio is the chief assistant to modern seafaring commerce. In fact, it is now almost impossible to visualize the condition of world commerce today without radio in the picture.

These considerations all help us to realize the obligation of the world's merchant shipping to that Irish-Italian gentleman and great inventor, Marconi, whose most prized possession was a small ribbon and medal sent to him by the survivors of the ill-fated Titanic. His life greatly enriched the world, and his passing on July 20 at his home in Italy is mourned by millions.

Like many another truly great scientist, Signor Marconi held toward his God the simple faith of a little child. It is reported that his last words were the repeating of a paternoster.

This reminds us of that beautiful anonymous verse entitled "Prayer":

"If radio's slim fingers can pluck a melody
From sky and toss it o'er a continent or sea;
If the white petaled notes of a violin
Are thrown across a mountain or a city's din;
If songs like crimson roses are culled from thin blue air;
Why should mortals wonder if God hears prayer?"

Licensed Officers' Promotions

The following list of American licensed officers for the Coastwise and Ocean services has been approved by the Pacific Coast offices of the Bureau of Marine Inspection and Navigation for original grade or raise in grade during June, 1937.

PORTLAND

Name and Grade	Class	Condition
Charles F. Fairbrass, 2nd Asst. Eng.	OSS, any GT	O
Francis C. West, 2nd Asst. Eng.	OSS, any GT	RG
Michael E. Jacobson, Chief Eng.	OMS, 300 GT	O
John V. Waters, Jr., Chief Eng.	OMS, 300 GT	O
2nd Asst. Eng.	OMS, any GT	

SAN FRANCISCO

Name and Grade	Class	Condition
Charles J. Tulee, Master	OSS, any GT	RG
Hans O. H. Matthiesen, Master & Pilot	OSS, any GT	RG
Hans A. Crauel, Chief Mate & Pilot	OSS, any GT	RG
Francis W. Wight, 2nd Mate	OSS, any GT	RG
Francisco Vidal, 2nd Mate	OSS, any GT	O
Leonid C. Asseeff, 2nd Mate	OSS, any GT	RG
Walter G. Hillert, 2nd Mate	OSS, any GT	O
Jon H. Thuesen, 2nd Mate	OSS, any GT	RG
Reginald Althowe, Jr., 3rd Mate	OSS, any GT	O
Rinaldo Bellero, 3rd Mate	OSS, any GT	O
Axton T. Jones, 3rd Mate	OSS, any GT	O
William J. Wagner, Jr., 3rd Mate	OSS, any GT	O
John L. Martensen, 3rd Mate	OSS, any GT	O
Charles D. Hammel, 3rd Mate	OSS, any GT	O
Roy C. Thompson, Chief Eng.	OSS, any GT	RG
Gerrit de Raad, 1st Asst. Eng.	OSS, any GT	RG
Wesley W. Basford, 1st Asst. Eng.	OSS, any GT	RG
William B. Coles, 1st Asst. Eng.	OSS, any GT	RG
Jack R. Curry, 1st Asst. Eng.	OSS, any GT	RG
Francis X. George, 2nd Asst. Eng.	OSS, any GT	RG
Clyde C. Ermill, 2nd Asst Eng.	OSS, any GT	O
Edward F. Price, 2nd Asst. Eng.	OSS, any GT	O
William R. Wyllie, 2nd Asst. Eng.	OSS, any GT	RG
Victor U. Buenzle, 2nd Asst. Eng.	OSS, any GT	RG
John G. Ellis, 2nd Asst. Eng.	OSS, any GT	RG
George C. Guglielmoni, 2nd. Asst. Eng.	OSS, any GT	O
Joseph M. Bell, 2nd Asst. Eng.	OSS, any GT	RG
Ralph R. Clay, 3rd Asst. Eng.	OSS, any GT	O
William P. Cubitt, 3rd Asst. Eng.	OSS, any GT	O
David E. Chaplin, 3rd Asst. Eng.	OSS, any GT	O
Vincent J. McGarry, 3rd Asst. Eng.	OSS, any GT	O
Vladimir V. Moller, Chief Eng.	OMS, any GT	RG
Wayne F. McNeil, 1st Asst. Eng.	OMS, any GT	RG

SAN PEDRO

Name and Grade	Class	Condition
Don G. Hamrick, Master	Coastwise Steam, 100 GT	O
Floyd Otto Smith, Master	Coastwise Steam, 100 GT	O
Otto T. Matthies, Master & Pilot	OS, Yacht, any GT	RG
Christopher Farevaag, 2nd Mate	OSS, any GT	O
George Garvin, 2nd Class Pilot	OSS, 150 GT	O
Robert L. London, 2nd Class Pilot	OSS, 150 GT	O
Lee I. Humiston, Chief Eng.	OSS, any GT	RG
Jack Law, 1st Asst. Eng.	OSS, any GT	RG
Raymond J. Pierrepont, Jr., 2nd Asst. Eng.	OSS, any GT	O
Hubert C. Everingham, 3rd Asst. Eng.	OSS, any GT	O
Daniel R. Farnham, 3rd Asst. Eng.	OSS, any GT	O
Ole D. Johnson, 3rd Asst. Eng.	OSS, any GT	O
Lester L. Maxfield, Chief Eng.	OMS, 500 GT	O
George M. McPhie, Master	OSS, any GT	RG
John J. Kelly, Master	Ocean Fishing, any GT	O
Second Mate	OSS, any GT	
Elias R. Hansen, Master	Ocean Fishing any GT	O
Third Mate	Coastwise SS, any GT	
John J. Kelly, Master	Ocean Sail, any GT	O
Rhodes E. Day, 3rd Mate	OSS, any GT	O
George E. Kemp, Mate	Inland SS, any GT	O
Pilot	OSS, any GT	
Julius R. Pensworth, Chief Eng.	OMS, any GT	O
Peter J. Sommerseth, Chief Eng.	OMS, any GT	O

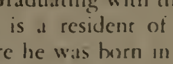
Abbreviations. GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Scholarships for Foreign Study Awarded by Naval Architects

An award of two scholarships for further studies in naval architecture and marine engineering at institutions of higher learning in England and Italy has just been announced by The Society of Naval Architects and Marine Engineers, 29 West 39th Street, New York. The society periodically gives this opportunity to outstanding students in naval architecture and marine engineering in the several American schools and colleges which offer this course.

Recipients of the awards this year are S. Curtis Powell and A. Dudley Haff. Powell graduated in 1937 with the degree of Bachelor of Science from Massachusetts Institute of Technology, Cambridge, Mass., and received a scholarship at Regia Scuola D'Ingegneria Navale Di Genova (Royal School of Naval Engineering of Genoa). His home is in North Billerica, Mass.; he was born in Boston in 1915, and is a graduate of the Littleton, Mass., High School. He left for Italy on June 24 and will spend the summer working in one of the Italian shipyards.

A. Dudley Haff was graduated from Webb Institute of Naval Architecture, Bronx, N. Y., in 1937, and was awarded a scholarship for a course at Cambridge University, England. Graduating with the degree of Bachelor of Science, he is a resident of Hempstead, Long Island, N.Y., where he was born in 1916, and a graduate of Hempstead High School. He will leave for England sometime in the summer.



Fulflo Filter For Diesel Fuel Oil

A filter well known in industrial fields for the final clarification of liquids generally is announced for the purification of diesel fuel oils by the Commercial Filters Corporation.

The accompanying illustration shows the unique manner in which the Fulflo Filter tube is constructed of cotton yarn and wound into tube form upon a metal core to provide a compact filter element and ease of assembly.

The filter tube in turn is mounted on two seat plates having a patented recessed center which seals both ends to prevent by-passing of unfiltered oil. The tube assembly is then held in place in the filter shell by spring tension to compensate for varying pressures.

Based upon the principle of depth filtration with uniform density, the filter will handle any grade of fuel oil at any temperature and against pressure of from one to a hundred pounds per square inch without modifying the filtering element.

This filter is generally installed between the transfer pump and the injector pumps, taking the full flow of fuel oil with a very low pressure drop. Other installations upon stationary diesel engines may be made either upon the pressure discharge to the Day tank or by gravity flow to the engine.

Some advantages claimed for the filter are:

(1) Large volume capacity;

(2) Absolute purity of the fuel, insuring freedom from a scored injector pump or clogged nozzle jet;

(3) Low cost of initial investment and long filter tube life before replacement at cost of only a few cents;

(4) Elements having a size and density for any type of fuel and for any size of diesel engine;

(5) Filter tube replacement in less than one minute, simply by unscrewing the ring which attaches the shell to the filter body.

The manufacturers have also adapted this type of filter to the by-pass continuous flow purification of crankcase oils for internal combustion engines used in marine, automotive, and industrial service.

Essential parts of Ful-Flo oil filter and assembly.

Distributor Appointed

The Toumey Electric and Engineering Company of San Francisco has recently been appointed Marine Distributor for Marvel Mystery Oil in the San Francisco district.

This lubricant is being marketed to the marine field with fine success on the East Coast.

Some of the characteristics that are claimed to be necessary in an oil of this nature are:

The film strength of the oil itself must be at least three times greater than current oils to be capable of standing up under thin layer lubrication—"Boundary Film Lubrication." Minute areas of bearing surfaces create extreme high pressures and depend on boundary film for protection against roughing of the surface. From the finest bearing to the removal of a rusty bolt, this film strength of the oil is essential.

Of prime importance is the ability of the oil to retain the strength properties so it will not separate out by distilling off under heat or by settling out when at rest.

It must be neutral to all metals used in a motor, especially the various alloys and mixtures of metals used in the perfecting of new bearing surfaces.

It must be capable of lubricating the cool intake valves of a motor, the hot upper cylinder walls, rings and pistons, and of keeping clean the extremely hot exhaust valves; also of neutralizing the corrosive effects of the by-products of combustion.

The pour point must be low, and the oil active at 60 or 70 degrees below zero, to blend completely with other oils and prohibit the formation of gum and varnish-like skin coatings on metal surfaces.

The oil must be capable of removing from the bearing surfaces a substance which cannot be seen but which can be easily measured by power loss when it is present. (It is present on practically all bearings after about 50 hours' running time.)

The oil must be a good cooling agent, and must easily gather the bearing heats and quickly give this heat off in the coolers. It must have low viscosity and low internal friction so that its own heat production may be kept at a minimum.

These and many other characteristics must be in and a part of the oil in order that it do its work properly.

Wages and Sling Loads

(Continued from Page 17)

When the following cargoes are leaking or sifting because of damage or faulty containers, a penalty of 10c per hour shall be paid; and total rate shall be:

Straight time, per hour	$1.05
Overtime, per hour	1.50

Analine Dyes

Fish Oil, whale oil and oriental oils, in drums, barrels or cases

Lamp black.

5. PENALTIES TO CERTAIN GANG MEMBERS: To winchdrivers, hatchtenders, siderunners, burton men, donkey drivers, stowing machine drivers and boom men only:

Handling lumber and logs out of water

Straight time, per hour	$1.15
Overtime, per hour	1.60

To Boom men only:

Handling creosoted products out of water

Straight time, per hour	$1.25
Overtime, per hour	1.70

To Hold men only:

All paper and pulp in packages weighing 300 lbs. or over per package, only when winging up, and when stowing in fore peaks, after peaks and special compartments other than regular cargo spaces. (This does not apply to rolls)

Straight time, per hour	$1.05
Overtime, per hour	$1.50

To Hold Men only:

Head room: When there is less than 6 ft. of head room—

(a) Loading cargo in hold on top of bulk grain.

(b) Covering logs or piling with lumber products.

Straight time, per hour	$1.05
Overtime, per hour	1.50

6. PENALTIES FOR SPECIAL CONDITIONS:

Damaged cargo: Cargo badly damaged by fire, collision, springing a leak or stranding, for that part of cargo only which is in a badly damaged or offensive condition:

Straight time, per hour	$1.50
Overtime, per hour	1.50

Cargo damaged from causes other than those enumerated above, shall, if inspection warrants, pay the damaged cargo rate or such other rate as determined by the Labor Relations Committee for handling that part of the cargo only which is in a badly damaged or offensive condition.

Explosives: When working explosives, as defined by current Western Classification Rules, all men working ship and barge to receive:

Straight time, per hour	$1.40
Overtime, per hour	1.40

Fire: When fire is burning or cargo smouldering in a hatch, the gang working the hatch to receive:

Straight time, per hour	$2.10
Overtime, per hour	2.10

Maxium Loads for Standard Commodities Pacific Coast Ports

Effective July 26, 1937

1. On and after July 26, 1937, at 8 o'clock in the morning, the maximum loads hereinafter specified shall be adopted for the commodities hereinafter referred to in all ports coming under the provisions of said agreement of February 4, 1937. After the effective date of this agreement all loads for commodities covered herein handled by longshoremen shall be of such size as the employer shall direct, within the maximum limits hereinafter specified, and no employer after such date shall direct and no longshoremen shall be required to handle loads in excess of those hereinafter stated. The following standard maximum sling loads are hereby adopted:

(1) CANNED GOODS

24-2½ talls, 6-12's talls and 48-1 talls (including salmon)	35 cases to sling load
or when loads are built of 3 tiers of 12	36 cases to sling load
24-1 talls	60 cases to sling load
24-2's talls	50 cases to sling load
6-10's talls	40 cases to sling load
Miscellaneous cans and jars	Maximum 2100 lbs.

(2) DRIED FRUITS AND RAISINS—(GROSS WEIGHT)

22 to 31 lbs.	72 cases to sling load
32 to 39 lbs.	60 cases to sling load
40 to 50 lbs.	40 cases to sling load
24-2 lbs.	35 cases to sling load
48-15 oz.	40 cases to sling load

(3) FRESH FRUIT—Standard Boxes

Oranges	Standard, 27 boxes to sling load
Oranges	Maximum, 28 boxes to sling load
Apples and Pears	40 boxes to sling load

(4) MISCELLANEOUS PRODUCTS

Case oil—2 5-gal. cans (Hand hauled to or from ship's tackle)	18 cases to sling load
(Power hauled to or from ship's tackle)	24 cases to sling load
Cocoanut	12 cases to sling load
Tea—Standard	12 cases to sling load
Tea—small	16 cases to sling load
Copper (Large)	5 slabs to sling load
Copper (Small)	6 slabs to sling load
Copper (Bars)	9 bars to sling load
Cotton, under standard conditions	3 bales to sling load
Rubber (1 tier on sling) maximum of	10 bales to sling load
Gunnies, large	2 bales to sling load
Gunnies, medium	3 bales to sling load
Gunnies, small	4 bales to sling load

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Pacific Shipping and Port Notes

(Continued from page 32)

purchases from the Philippines. We are not, like Germany, bidding for needed commodities, but are attempting to hold a market while we penalize and restrict the only goods that we are willing to accept in payment. It appears that we shall have to retreat from the Philippine market for some categories of commodities, e.g. cheap manufactures and foodstuffs more economically produced elsewhere.

The fate of American investments in the Philippines is still to be seen. The national debt of the Islands, mostly owed to the U.S.A., is well secured by a first lien on Philippine revenues accruing during the second five years of the Independence maturation period. Private investments are in a different category and, broadly speaking, may be regarded as secure or insecure as the Philippines succeed or fail in diversifying and stabilizing their agriculture and industry. If the Philippines are unable to dispose profitably of their surplus coconuts and sugar, and if they are unable to diversify their industrial and agricultural production sufficiently and in time to escape the penalties of overspecialization, the ensuing economic dislocation will be severe and all investments there will be in a precarious position.

Two measures might be taken which would alleviate the present and prospective stress upon the Philippine economic structure. Legislation to ameliorate the effects of the Jones-Costigan and Revenue acts, and of some of the provisions of the Tydings-McDuffie act, would maintain the purchasing power of the islanders. A degree of tariff autonomy, secondly, would protect and foster island manufacturing industries. In short, a very gradual change in the former status of Philippine-U.S.A. trade relations, together with an opportunity to develop their domestic industries, would assure the economic stability of the Islands and the future of American interests.

[American Council, Institute of Pacific Relations.]

Big Ditch Busy

By F. H. Langworthy

Administrative Asst. Panama Canal Zone

An all-time peak in cargo passing through the Panama Canal from the Atlantic to the Pacific was reached during the fiscal year 1937, which ended June 30, while total cargo in both directions through the waterway was the highest since the fiscal year 1930.

The Atlantic to Pacific total for the year ending June 30, 1937, was 9,895,653 tons, which is 22,103 tons, or 0.2 per cent, more than the previous peak year of 1929, when cargo transiting in this direction (southbound) totaled 9,873,529 tons. The increase in southbound cargo during the year was due to a large mea-

The bucket dredge Cascades working on the Washington shoal, Panama Canal.

sure to record scrap iron shipments from the United States to the Orient.

Cargo shipments through the Canal from the Atlantic to the Pacific have increased steadily since the low mark of 4,507,070 in the fiscal year 1933. In 1934 the cargo tonnage was 6,162,649 tons, 7,529,721 in 1935, 8,249,899 in 1936, and 9,895,632 in the past fiscal year.

A comparison of cargo shipments through the Canal from the Atlantic to the Pacific for the past twelve years shows the previous peak years and the effect of the years of industrial depression:

ATLANTIC—PACIFIC

Fiscal Year	Cargo Tonnage	Total Traffic Cargo Tonnage
1937	9,895,632	28,108,375
1936	8,249,899	26,505,943
1935	7,529,721	25,309,527
1934	6,162,649	24,704,009
1933	4,507,070	18,161,165
1932	5,631,717	19,798,986
1931	6,670,718	25,065,283
1930	9,472,061	30,018,429
1929	9,873,529	30,647,768
1928	8,303,344	29,615,651
1927	8,576,474	27,733,555
1926	8,034,593	26,030,016

Ocean-going commercial vessels using the Panama Canal during the fiscal year 1937 totaled 5,387, an increase of only five over the fiscal year 1936, but the highest fiscal year total since 1930. Tolls on the ocean-going commercial ships amounted to $23,102,137.12, a decrease of 1.6 per cent over the fiscal year 1936.

The total of vessels using the Canal during the fiscal year 1937 has been exceeded only three times in the

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Maritime Social Security

By Guy T. Helvering
Commissioner of Internal Revenue

Every person employed in the marine manufacturing and shipping industries comes under the provisions of Title VIII of the Social Security Act, which imposes an income tax on the wages of every taxable individual and an excise tax on the pay roll of every employer of one or more. This tax is payable monthly at the office of the Collector of Internal Revenue. The present rate for employer and employee alike is one per cent of the taxable wages paid and received.

Under Title IX of the Act, employers of eight or more persons must pay an excise tax on their annual pay roll. This tax went into effect on January 1, 1936, and tax payments were due from the employers, and the employers alone, at the office of the Collector of Internal Revenue on the first of this year. This tax is payable annually, although the employer may elect to pay it in regular quarterly installments.

The employer is held responsible for the collection of his employee's tax under Title VIII, and is required to collect it when the wages are paid the employee, whether it be weekly or semi-monthly. Once the employer makes the one per cent deduction of Federal funds and pay, he becomes the custodian of Federal funds and must account for them to the Bureau of Internal Revenue.

This is done when the employer makes out Treasury form SS-1, which, accompanied by the employee employer tax, is filed during the month directly following the month in which the taxes were collected. All tax payments must be made at the office of the Collector of Internal Revenue in the district in which the employer's place of business is located.

Penalties for delinquencies are levied against the employer, not the employee, and range from 5 per cent to 25 per cent of the tax due, depending on the period of delinquency. Criminal action may be taken against those who willfully refuse to pay their taxes.

SOCIAL SECURITY FEATURES

Actual money, when paid as wages, is not the sole basis on which the tax is levied. Goods, clothing, lodging, if a part of compensation for services, are wages and a fair and reasonable value must be arrived at and become subject to the tax.

Commissions on sales, bonuses and premiums on insurance are wages and taxable.

Officers of corporations whether or not receiving compensation are considered employees for the purpose of taxation.

Wages paid during sick leave or vacation, or at dismissal are taxable.

Traveling expenses required by salesmen are not wages if the salesmen account for, by receipts or otherwise, their reasonable expenditures. That part for which no accounting is made is construed as a wage and is taxable.

Exercise great care in filling out Treasury forms SS-1 and 940. Directions are easy to follow and correct returns mean no unnecessary delay.

The employers of one or more are also required to file Treasury forms SS-2 and SS-2a. Both are informational forms and must be filed at Collectors' offices not later than July 31, 1937, covering the first six months of the year. After that they are to be filed at regular quarterly intervals. Form SS-2 will show all the taxable wages paid to all employees and SS 2a the taxable wages paid each employee.

Participation in a state unemployment compensation fund, approved by the Social Security Board, does not exempt employers from the excise tax under Title IX, Commissioner Helvering said. Nor does the fact that

there is no state unemployment compensation fund relieve the employer of his Federal tax payments. In those states where an unemployment compensation fund has been approved, deductions up to 90 per cent of the Federal tax are allowed the employer who has already paid his state tax. These deductions are not allowed unless the state tax has been paid.

This tax is due in full from all employers in states having no approved fund. The rate for 1936 was one per cent of the total annual pay roll containing eight or more employees, and for 1937 it is two per cent. The rate increases to three per cent in 1938 when it reaches its maximum. The annual returns are made on Treasury form 940.

An employer who employs eight or more persons on each of twenty calendar days during a calendar year, each day being in a different calendar week, is liable to the tax. The same persons do not have to be employed during that period, nor do the hours of employment have to be the same.

Lloyd's Register of American Yachts, 1937

This hardy perennial, established by Lloyd's Register of Shipping in 1903, continues its regular increase in size, the new book listing 6209 yachts, as compared with 5701 last year. The color plates of flags include approximately 3000 private signals of yachtsmen and over 600 burgees of the yacht clubs of the United States and Canada.

The new entries run to a total of 514, including all classes of yachts, of which but little more than 12 per cent are purely sailing craft. This by no means indicates the disappearance of the sail, but on the other hand must be taken as evidence of the perfection of the modern internal combustion engine both in point of efficiency and light weight, making it possible to install an engine in every size and type of yacht. The growing number of cruising yachts all depend on auxiliary power.

This year the interest centers primarily on the new Ranger, built to defend the America's Cup; a wonderful structure of mild steel with special high tensile steel on the topsides. Her overall length greatly exceeds all previous defenders, running to 135 feet 2 inches. A departure has been made this year in including a yacht of foreign ownership with the American craft, the Endeavour II, presumably the challenger. In overall length she exceeds even Ranger, though by only eight inches. However, the waterline of the Endeavour II is 86 feet 7 inches, while that of the Ranger is 87 feet. The draft is necessarily the same; but the beam of Ranger, 20 feet 11 inches, is less by 8 inches than Endeavour II. Supplementing the entry of Endeavour II is that of her owner's new diesel yacht, Philante, which will serve as tender to the two Endeavours; 263 feet overall; 240 feet waterline; 38 feet beam and 14 feet 6 inches draft.

Next in point of size among the additions to the racing fleet is the 12-Metre Gleam, designed by Clinton H. Crane for his own use. The 8-Metre Class has but two additions, Yucca and Prelude, both built for the Pacific Coast, as the Class is weak in the East. The 6-Metre Class shows four new yachts, Lulu, Rebel, Circe and Light Scout.

The Register is published annually at the end of May by Lloyd's Register of Shipping, 17 Battery Place, New York, the price being $12.00 for the canvas edition and $14.00 for the blue and gold edition.

Wandering Buoy Returns

Lighted buoy 1, which is stationed outside of Monroe, Mich., in the west end of Lake Erie, was carried out by the ice at the close of navigation last year and surprised the officers of the tenth lighthouse district by showing up again recently upon the opening of navigation in the vicinity of Dunkirk, N. Y., where it was recovered by the tender Cherry, uninjured except for the lantern, which had been torn off by the ice. The buoy had not only traveled over 200 miles but had threaded its way through the ice among the islands in the west end of Lake Erie with its 3,500-pound concrete mooring sinker attached. As a vessel officer pointed out, it exhibited an ability to avoid the shoals not found in some navigators. All that was necessary to restore it to service was replacement of the lantern and lantern gallery and renewal of the paint, which had been badly worn off during its winter voyage.

[U. S. Lighthouse Bulletin]

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

American Shipbuilding Doubles in Year

As of May 1, 1937, the American Bureau of Shipping reported as under construction in American commercial shipbuilding yards 218 vessels, with an aggregate gross tonnage of 310,051. These figures are exclusive of naval fighting craft, but include some Government ships, such as lighthouse tenders, dredges, lightships, towboats, and derrick barges.

The totals may be compared with those of May 1, 1936, which show 138 vessels, aggregating 162,000 tons, or an increase of over 90 per cent for the year.

When considering the prospects for the American shipbuilder, bear in mind that none of these vessels are being built under a shipbuilding subsidy. The U. S. Maritime Commission building program under the Shipbuilding Subsidy Section of the Merchant Marine Act of 1936 has not yet started.

Federal Launches Tanker

Hull 143, first of a group of four 12,800-ton tankers building at Federal Shipbuilding and Dry Dock Company for the Standard Oil Company of New Jersey, was launched July 24 and christened with the euphonious name of Esso Bayonne. Her keel was laid December 16, 1936. She was built on the Isherwood bracketless longitudinal system of framing and to the Isherwood arc-form design. This ship and her three sisters will be of the same general characteristics as the R. P. Resor and T. C. McCobb, built in the Federal yard and delivered to Standard Oil Company of New Jersey last summer. Water tube boilers delivering high pressure steam to geared turbines will comprise the power plant.

Tanker Esso Bayonne

Keel for Hull No. 144 was laid February 8, 1937. Keel for Hull No. 145 will be laid immediately on the ways made vacant by the launch of Esso Bayonne, and keel for Hull No. 146 will follow launch of Hull No. 144, which is scheduled in the near future.

Associated Orders New Tanker

On July 14 Tide Water Associated Oil Company awarded a contract to the Sun Shipbuilding and Dry Dock Company of Chester, Pa., for the construction of an all-service oil tanker to be used in the Pacific coastwise and offshore trades by the Associated Division, with headquarters in San Francisco.

This vessel will be of the most modern design and equipment. Built on the Isherwood bracketless type of construction, she will follow the recent practice of saving weight in the steel frame by welding and placing part of this weight in the side plating in way of tank spaces to offset corrosion. She is to be delivered in July, 1938.

Her principal characteristics are:

Overall length	462 feet
B. P. length	442 feet
Beam molded	65 feet
Depth molded	35 feet
Speed	13 knots
Deadweight capacity, 12,800 tons	

She will carry 102,000 barrels of gasoline, with 5,000 barrels of bunker fuel aft and 1,500 barrels forward, 235 tons of water aft in deep tanks, and 50 tons of stores, and crew.

Dredge Launched at Bethlehem

On July 28 the Union Plant of the Bethlehem Shipbuilding Company Ltd. (old Union Iron Works), San Francisco, was the scene of an interesting launching, when the hull of the hopper dredge Pacific slid down the ways. This vessel and her equipment were fully described in the July issue of Pacific Marine Review.

She is of shallow draft model, designed especially for work on bar channels at various Pacific Coast harbors, and has the following general characteristics:

Length of hull	180 ft. 3 in.
Beam molded	38 ft. 0 in.
Depth molded	14 ft. 0 in.
Draft light for'd	4 ft. 8 in.

Draft light aft.......... 7 ft. 8 in.
Draft loaded............. 10 ft. 10 in.
Speed loaded ....9 knots

For propulsion power she has twin screws, each driven by a 400 H.P. Winton diesel through a hydraulic coupling. For the dredging pump a 400 H. P. Winton diesel directly connected to a 275 K.W. General Electric direct current generator, supplemented by either or both of two 75 K.W. auxiliary diesel driven generating sets, supplies sufficient power so that the pump motor can work continuously at 425 H.P. if necessary.

The dredge Pacific is expected to be ready for her trial trip late in August.

Dredge Pacific was designed in the San Francisco office of the U. S. Army Engineers under the personal supervision of Principal Engineer F. C. Scheffauer, assisted by Senior Engineer H. D. G. Baxter and Associate Naval Architect H. A. Lennon. She embodies the knowledge gained in many years of experience in dredging safe channels through the bars of Pacific Coast harbors.

Pusey and Jones Launch Mine Planter

Christened by Mrs. Malin Craig, wife of the Chief of Staff, U. S. Army, the Ellery W. Niles, a diesel electric mine planter and cable layer for the Coast Artillery Corps, U. S. Army, slid down the ways into the Christiana River at the historic Pusey and Jones Shipyard, Wilmington, Delaware, on June 22.

This vessel is to be used in planting harbor defense mines and laying the cable for their detonation from shore stations. Her power plant consists of three 550 H. P., fresh water cooled, six cylinder Winton diesels, each direct connected to a 300 K.W. D. C. Westinghouse generator. The twin screws are each driven directly by a Westinghouse D.C. motor capable of developing 560 H.P. at 230 r.p.m. Kingsbury bearings take the thrust of the screws.

All auxiliary machinery is electrically operated. The entire hull is steel, insulated in exposed quarters by sheet cork. All living quarters

Launching of Ellery W. Niles.

are air conditioned. All applications of power, including the propulsion of the ship, are subject to distant control from the bridge and other points to an extent never before installed on a sea-going craft.

On the Ellery W. Niles the steering gear and deck machinery were supplied by Lidgerwood, the majority of the pumps by Worthington, the oil purifiers by Sharples, the gyro-compass equipment by Sperry, and the echo depth finders by Fathometer.

Orders from the bridge are transmitted through a Guided Radio loud speaker system, which provides 16 stations simultaneous or individual broadcasting or for two way voice communication.

She will have accommodations for a personnel of 45, and will be capable of 13½ knots speed. Her design was developed by Edward A. Hodge, Naval Architect, New York.

Contract for New Ferry

The Maryland Dry Dock Company of Baltimore, Md., was very recently awarded a contract for the construction of a double ended steel hull ferry by the Clairborne-Annapolis Ferry Company. This boat will be 208 feet by 62 feet by 9 feet, and is to be delivered in May, 1938.

Construction Starts on New Bulk Freighters

The American Shipbuilding Company at their Cleveland yard laid down on June 21 and July 6 the keels for two large bulk freighters contracted for by the Pittsburgh Steamship Company. These vessels will be 610 feet long, 60 feet beam, 32 feet 6 inches molded depth. Each will be driven by a 2,000 H. P. geared steam turbine power plant taking steam at 400 lbs. pressure from water tube boilers. All auxiliaries will be electrically operated.

Portland Firm Gets Feltre Repairs

The Italian motorship Feltre sank in the Columbia River on February 19 last after collision with the American steamer Edward Luckenbach. On examination, the hole in her side proved to be 250 feet long. By a very clever bit of salvage work she was raised and floated to Portland and dry dock. After considerable bickering over claims and counter claims she was libeled and sold at auction by the U. S. marshal to Pacific American Fisheries for $55,000, which, so far as liens on the ship were concerned, had to cover claims aggregating over $250,000. Bids for her repairs taken previous to her sale had shown Albina Engine and Machine Works, Portland, to be the low bidder at $328,157 cost and 110 days' time.

The Pacific American Fisheries have given the contract for repairs to the Portland firm. Undoubtedly she will be changed to American registry.

As will be noted from the illustration on the facing page, this job is a major piece of repair work. All frames, bulkheads, and shell plating for over half of the length of the Feltre will have to be either replaced by new material or faired up, reriveted or welded and refinished. All machinery will have to be overhauled and put in good condition, and the great bulk of this work will have to be done while the ship is in drydock.

Two More Tankers for Pan-Petroleum

As we go to press comes word from the Pan-American Petroleum and Transport Company of New York that they have placed an order with the Federal Shipbuilding and Dry Dock Company of Kearney, New Jersey, for two bulk oil tankers to be built along the same general lines as the four tankers now building at that plant for the Standard Oil Company of New Jersey. This would make these tankers of the same Isherwood Arcform design as the Esso Bayonne, launched by Federal on July 24.

This ship is of 12,800 tons deadweight capacity, has a length of 445 feet, a beam of 66 feet 6 inches, a loaded draft of 28 feet, and is in general the same type and size of hull as the R. P. Resor and the T. C. McCobb, which were completely described in Pacific Marine Review for January, 1936.

The addition of these two tankers gives the Federal yard six tankers and six destroyers, which should keep them quite busy for some months to come.

Freighter Converted to Tanker

The Craig Shipbuilding Company of Long Beach, California, are busily engaged in converting a freighter to a tanker. The vessel undergoing this transformation is the motorship Mazatlan. Built by the Long Beach Shipbuilding Company in 1920 as a steel hull shallow draft cargo carrier for the California and Mexico S. S. Company Inc., this vessel is 164.3 feet long, 34.1 feet beam, and 17.8 feet deep. She was fitted with twin screws, each screw being driven by a 350 brake horsepower diesel engine. She should make an ideal tanker for short coastwise runs and harbor work.

Campbell Gets Tuna Boat Contract

The Campbell Machine Company of San Diego, Calif., was recently awarded by the Van Camp Sea Food Company of Terminal Island, Calif., a contract for the construction of a 139 foot tuna fishing boat. This vessel will be equipped with a six cylinder, 600 horsepower Union diesel engine for propulsion, and with two 140 horsepower Union diesels, each driving a 100 K.W. General Electric generator, to furnish power for auxiliary machinery and lighting. Two 12 inch pumps will be installed for circulating water through her live bait tanks. Large refrigerating capacity will be provided to take care of her fish catch on the way home from distant banks.

Interesting view of motorship Feltre in dock at Portland, showing tremendous hole in her hull.

New York to Build $1,000,000 Fireboat

Bids were received by the City of New York on July 28 for the construction of a super fireboat. Specifications call for an all steel hull built to the highest classification of the American Bureau of Shipping. She will be 134 feet long, 32 feet molded beam, 13 feet 3 inches molded depth, and 9 feet loaded draft. She will be propelled by diesel electric drive on two screws, with a total developed propulsion horsepower of 2,000 at 425 r.p.m., and a speed of $16\frac{1}{2}$ knots on loaded draft. She was designed by Gibbs and Cox Inc., New York naval architects.

Included in the equipment is a two way radio and a special loud speaker system, so that orders from the bridge may be plainly heard in any part of the ship. Her collapsible water tower will have a maximum height of 45 feet above the waterline. Her crew will work and live in air conditioned quarters. Her interior will be protected against fire by a $C.O._2$ system. She will carry concrete smashing equipment to break through concrete floors on docks. Her bow plating will be strongly reinforced to enable her to break through ice floes on the river.

Eight water "guns" are to be carried on pedestals on the deck. The bow water "gun" is designed for a 6,000 gallon per minute capacity, and will be the most powerful afloat.

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1937 Metal Congress

The 1937 Metal Congress and Exposition will be held from October 18-22, inclusive, in Atlantic City Auditorium, according to announcement made by W. H. Eisenman, managing director of this annual Metal Show and national secretary of the American Society for Metals, after a meeting of the Society's board of trustees in this city.

This important metal event has been staged and sponsored for eighteen successive years by the American Society for Metals. It is one of the oldest and most popular industrial expositions in the country.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401);** completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; launched July 28, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Tug. W. B. Storey, District of Columbia, Admiral Watson, Manini, W. S. Miller, Mariposa, W. S. Rheem, Frank G. Drum, Makaweli, Hollywood.**

FELLOWS AND STEWART, INC.
Wilmington, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Yachts Retreat, Vellron, Gitana, and Nuova Del Mar; Cannery vessel North Cape; 62 smaller yachts and motorboats.**

GENERAL ENGINEERING AND DRYDOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Kewanee, Admiral Halstead, Lumberman, W. R. Chamberlin, Jr., Derrick Barge No. 34, Elna, Horace Luckenbach, Gas S. Contra Costa, Tug Arabs, Barge No. 4, Siskiyou, Solano, Korn, American Fisher, Malama, Noyo, Stanwood, Barge 1923, Barge No. 9, Lake Miraflores.**

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats; 1,600 H.P. each; Liberty-Vimalert conversions;** speed 30 m.p.h. Keels laid September, 1936; estimated launching dates August 10, September 1, September 15, and October 1, 1937; expected completion dates September to October, 1937.

Two **78'x20'x9'6" Lamparo** fishing boats; one for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; second for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. Delivery date October, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: **Steel Trader, M.S. Hawaiian Standard, M.S. Ward, President Harrison.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

NEW CONSTRUCTION: **120' steel** tuna vessel; 600 H.P. Enterprise diesel engine; delivery date September 15, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Yacht Aquillo, Barge U. O. Co. 1920, Seattle, U. S. Boxer.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

DRYDOCK AND ROUTINE REPAIRS: **F/B Chicken of the Sea, Edwin B. DeGolia, Cabrillo, F/B Minato Maru, Homer, Tug D. M. Renton, Tug D. P. Fleming, Launch Betty O, Tug Listo, Tug Vivo, La Placentia, L. A. Fireboat No. 2, M.V. Minowo Maru, M.V. Velma, La Purisima, Eagle, Eureka.**

MARE ISLAND NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION: **Henley,** Destroyer (DD391); standard displacement 1500 tons; keel laid October 28, 1935; launching date January 12, 1937; estimated delivery October, 1937.

Pompano, Submarine (SS181); keel laid January 14, 1936; launching date, March 11, 1937; estimated delivery, October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: **Aylwin, Dale, Farragut, MacDonough, Monaghan, Detroit, Houston, Algorma, Pinola, Vireo, Bridge, Gannet, Dobbin, Wright.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Balboa, Columbian, Transport Meigs, H. T. Harper, Adellen, Davenport, Arizonan, Redwood, San Bernardino, Transport Republic, Golden Coast, Dakotan, Coloradan, Esther Johnson, Pres. Adams, West Nilus, Ohioan, Cutter 401, Golden Cross, Beulah, Dintledyk, Carriso, Pres. Harrison, Bailhache.**

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: 16 fishing boats; 10 scows; 42 ship repair jobs not requiring docking; 50 commercial jobs.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; estimated completion date, November 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Arizona, Pennsylvania, Saratoga, New Orleans.**

STEPHENS BROS. BOATYARD
Stockton, Calif.

NEW CONSTRUCTION:

Stephens 36, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched March 22, 1937.

Alicita, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched April 4, 1937. Owner, J. V. Carson, Hollywood.

Dalida II, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched April 11, 1937. Owner, D. A. Lord, San Francisco.

Irma Lou II, 36' x 9' 10" x 2' 4"; powered by Twin Gray "Six-71's." Launched May 26, 1937. Owner, Louis C. Boone, San Francisco.

One 29' sport fishing cruiser (special) for J. C. Axelson, Los Angeles; powered by twin Lycomings "Six-85."

Nine standard stock 29's.
Six standard stock 36's.
Ruth K, 29' 2" x 9' x 2' 4"; powered by Gray "Six-51." Owner, Elmer Gumpert Stockton. Launched April 17, 1937.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.
DRYDOCK AND ROUTINE REPAIRS: President Jefferson, Edgar F. Luckenbach, Dorothy Alexander, Point Vincente, North Haven.

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.
NEW CONSTRUCTION: Hull No. 127, Yankee Clipper; purse seiner, 82' x 20'; 200 H.P. Atlas engine; keel laid May 26, 1937; launched July 22, 1937. Owners, Ed. & J. Kaseroff and E. Manaxa, of San Pedro, Calif.
Hull No. 128, Santa Lucia, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 15, 1937; delivery date September, 1937. Owner, Frank Cardinale.
Hull No. 129, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 19; delivery date, October, 1937. Owner, Roy Hegiv, Seattle.
DRYDOCK AND ROUTINE REPAIRS: Fishing boat Western Traveler, Clipper Wanderer, Tacoma & Pierce; yacht Carmelita; tug Betty Earls.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania
NEW CONSTRUCTION:
One oil barge, 145' x 26' x 7' 4" for Standard Oil Co. of Ohio; completion date August 1, 1937.
One floating fender, 200' x 7' x 3½', for National Tube Co.; completion date August 1, 1937.
DRYDOCK AND ROUTINE REPAIRS: 9 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio
NEW CONSTRUCTION: Two bulk lake freighters 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Keels laid June 21, 1937; and July 6, 1937; launching date October, 1937; delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine
NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; DD394 Sampson, DD395 Davis and DD396 Jouett; Three 1850 ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively. DD396, keel laid, Mar. 26, 1936. DD395, keel laid July 28, 1936. DD394, keel laid April 8, 1936.
Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.
Hull No. 175, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, September 1, 1937.
Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass. owners; estimated delivery, September 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.
NEW CONSTRUCTION:
DD-382, Craven, 1500 Ton Destroyer. Keel laid June 3, 1935; launched February 25, 1937; estimated delivery, August, 1937.
CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.
Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; estimated launching date August, 1937; estimated delivery, February, 1938.
Annapolis, West Point, Yale; three diesel drive trawlers for General Sea Foods. Estimated delivery October, 1937.
Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.
NEW CONSTRUCTION: Two oil tankers—steam—425'x64'x34' for Gulf Oil Corp.; total tonnage 7070 each.
Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.
One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.
One barge for Socony-Vacuum Oil Co., Inc.; 260 feet long; non-propelled. Estimated delivery date October, 1937.

BOSTON NAVY YARD
Boston, Mass.
NEW CONSTRUCTION:
DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.
DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; launching date February 1, 1938; estimated delivery indefinite.
Order placed for DD415, O'Brien, and DD416, Walke, two destroyers; delivery dates, August, 1939, and October, 1939, respectively.
One large harbor tug for U. S. Navy; delivery date 1938.

BROOKLYN NAVY YARD
Brooklyn, N.Y.
NEW CONSTRUCTION:
CL 40, Brooklyn, light cruiser, L B P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.
CL 48, Honolulu, light cruiser; L B P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935; launching date August 16, 1937; estimated delivery, May 1, 1938.
CL 50, Helena, light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York
NEW CONSTRUCTION: Two 76' all-welded diesel towboats of 550 H. P. each, for private parties. Delivery dates August 1, 1937 and September 1, 1937.

CHARLESTON, S. C., NAVY YARD
Charleston, S.C.
NEW CONSTRUCTION:
Order placed for one harbor tug; LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.
NEW CONSTRUCTION: Two trawlers for the Portland Trawling Company; 146'6'x25'x14'2".
DRYDOCK AND ROUTINE REPAIRS: Minerva, Launch Eva May, Tug Cecilia, Yachts Polaris and Osprey, Lighthouse Tender Cypress, Tug Barrenfork, Launch Louise, Yacht Romiltek, Fishing Boats Francis G. and Tartar, Tug Juno, Floridian, Fishing Boat Jackie, Barge Arrow.

CONSOLIDATED SHIPBUILDING CORP.
Morris Heights, New York City
Three 39' play boats for stock.
One 42' play boat for stock.
One 56' cruiser, 2 Lathrops; delivery date, August 1, 1937.
One 57' cruiser; delivery date September 15, 1937.
One 20' runabout.
One 50' cruiser, 2 MC Speedways; delivery date August 1, 1937.
One 42' play boat, 2 Chrysler Royals; delivery date August 1, 1937.
One 80' diesel cruiser; delivery date autumn, 1937.
One 45' cruiser; estimated delivery date September 1, 1937.
One 30' launch, one Kermath; delivery date August 31, 1937.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One lighthouse tender, Elm, 72′ 4″ x 17′ 0″ x 6′ 6″, for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

One diesel yacht, powered by 1,000 h.p. Winton engines; 143′ long, 23′ beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION: **Hull No. 997**, one diesel sternwheel towboat of 91 gross tons.

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100′x26′ x6′6″; 330 gross tons.

Hull No. 1374, one welded flush deck cargo box barge 130′ x 34′ x 10′, for Warner Equipment Co., Philadelphia, Penn.; 452 gross tons.

Hulls Nos. 1378 and 1384; two welded steel deck barges 80′ x 30′ x 9′, for Pennsylvania Railroad, Philadelphia, Penn.; 354 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Shipping Company; 600 gross tons.

Hulls Nos. 1416 and 1419-1424, inclusive; seven welded type W-3 coal barges 175′ x 26′ x 10′ 8″; for stock; 3304 gross tons.

Hull No. 1425; one welded steel fuel flat 110′ x 24′ x 9′; for Union Barge Line Corp.; 200 gross tons.

Hull No. 1426; one welded steel fuel flat 80′ x 18′ x 6′; for Union Barge Line Corp.; 65 gross tons.

Hulls Nos. 1427-1428, inclusive; two welded steel covered lighters 110′ x 33′ x 9′ 6″; for Reading Co., Philadelphia, Pa.; 1120 gross tons.

This makes a total of 21 hulls with a total gross tonnage of 6836 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936; launching date August 25, 1937.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October 22, 1937.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937.

Hull No. 30, Saury (SS189); keel laid June 28, 1937.

Hull No. 31, Spearfish (SS190); estimated keel laying date September 9, 1937.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, **DD381 Somers and DD383 Warrington; keels laid June 27,** 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, **DD397 Benham, DD398 Ellet and DD399 Lang**, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing. Hull 143, Esso Bayonne, keel laid December 16, 1936; launched July 24, 1937. Hull 144, keel laid February 8, 1937.

Two destroyers, DD411 and DD412.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8′. Probable launching date September 21; delivery date, approximately Oct. 15.

One steel vegetable oil barge for New York Tank Barge Co., N.Y.; 650 tons gross; capacity 1250 tons; 195 x 42 x 12. Estimated launching date September 1, 1937; estimated delivery date September 25, 1937.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all-welded steel diesel tugboat; 74′ long, beam 19′, depth 9′; equipped with 380 H.P. Atlas Imperial engine; for Higman Towing Co., Orange, Texas. Delivery date, August, 1937.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank steamer**, 465′x55′x28′, for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,-700,000 gallons of oil. Estimated launching date, August, 1937; delivery date, autumn, 1937.

MARIETTA MANUFACTURING COMPANY
Point Pleasant, West Virginia

NEW CONSTRUCTION:

Three all welded steel oil barges 175′ x 35′ x 8′ 6″, for Standard Oil Co. of New Jersey; to be used for service on Ohio and Mississippi Rivers; delivery date August, 1937.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **One** doub[le] ended steel diesel ferry boat, 208′ x 6[..] x 9′, for the Claiborne-Annapolis Ferr[y] Company; delivery date May, 1938.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 41[2], Savannah (CL42), Hull No. 413, Nash[]ville (CL43), and Hull No. 416 Phoeni[x] (CL46) of 10,000 tons each for th[e] U.S. Navy Department; keels laid, 193[5] No. 412, launched May 8, 1937.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359 air[]craft carrier CV5, Yorktown**, for U. S. Navy; keel laid May 21, 1934; launche[d] April 4, 1936.

H360 aircraft carrier, CV6, Enter[]prise, for U.S. Navy.; keel laid July 1[6] 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, kee[l] laid April 1, 1935; launched, Decembe[r] 3, 1936.

H362, light cruiser CL49, St. Louis keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers Nos. 413, Mustin, and 414 Russell; esti[]mated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs fo[r] C. & O. Railway; LOA 109′, beam 28′ depth 14′6″. Keels laid May 24, 1937.

PHILADELPHIA NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61 9¾″, depth molded at side to main deck amidships 42′0 3/8″, draft correspond[]ing to normal displacement 21′10″, standard displacement 10,000; estimat[]ed completion January 1, 1938.

Order placed for **DD404**, 1500 to[n] destroyer; no dates set.

PORTSMOUTH, N. H., NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300′, beam 26′, loaded draft 15′7″; launching date August 24, 1937; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300′, beam 26′, loaded draft 15′7″; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B.P. 302′6″, beam 26′10″, loaded draft 16′8″.

SS192, Squalus, submarine; contract period started December 1, 1936; L.B.P. 302′6″, beam 26′10″, loaded draft 16′8″.

Two submarines authorized in 1937; names or numbers not yet assigned.

(Page 64, Please)

Observations From The Crow's Nest

"NAMES AND NEWS" ★ BERNARD De ROCHIE, LOOK-OUT MAN

Fred Doelker Visits Agencies

Fred L. Doelker, Pacific Coast manager of Grace Line, sailed recently on the Santa Rosa for New York via the Spanish Americas, accompanied by Mrs. Doelker, their daughters, and their son. En route Doelker visited the line's agencies in Mexico and Central America. In New York he conferred with officials of the company before sailing for home.

Admiral Line Resignations

Resignation of three veteran Pacific Steamship Company (Admiral Line) executives, **Hugh B. Brittain,** passenger traffic manager; **Charles E. Perkes,** freight traffic manager; and **Charles E. Fllye,** assistant freight traffic manager; was recently announced. They had been standing by for several months while the company's operations were at a standstill.

Charles Wheeler Addresses T. M's

In a talk before the Industrial Traffic Managers Association, **Charles L. Wheeler,** vice president and general manager of the McCormick Steamship Co., prophesied great gains for the U. S. merchant marine during the next few years under the new shipbuilding subsidy plan. He declared that a slight rise in the standard of living would result in more than a 100 per cent increase in world trade.

GRACE PACIFIC COAST MANAGER VISITS NEW YORK
Fred L. Doelker, Pacific Coast Manager of the Grace Line, shown aboard the Grace liner Santa Rosa as he arrived in New York July 13th, accompanied by his family for a short visit in the east. Left to right: Fred L. Jr., Mrs. Doelker, Florence Doelker, Mr. Doelker, Fredrika Doelker.
—Photo courtesy Grace Line

Lisle McKim Receives Appointment with General

Appointment of **Lisle I. McKim** as Manager of Solicitation for the General Steamship Corporation, Ltd., was announced today by Harry S. Scott, President of the firm. Mr. McKim will succeed **C. M. Covell,** who recently resigned to assume the duties of Director of Transportation for the Golden Gate International Exposition.

Mr. McKim, who is leaving the position of Assistant Traffic Manager of the River Lines to assume his new duties, beginning August 1, brings to his new position a wealth of experience as well as a broad acquaintance with shippers throughout Northern California, coupled with a pleasing personality that has won him hundreds of friends.

He entered the transportation business in 1917 as a clerk in the Southern Pacific Company, where he served until 1922, when he turned to the Pacific Mail Steamship Co. for experience in the offshore business. Between 1924 and 1932 he was back again in railroading, serving as General Agent in Sacramento for the Sacramento Northern and Western Pacific. For the past five years he has been connected with the River Lines, both in Sacramento and San Francisco, first as General Freight and Passenger Agent and later as Assistant Traffic Manager.

Mackay Appointments Transfer Coast Men to New York

H. L. Rodman.

T. E. Nivison.

An announcement by **Admiral Luke McNamee,** President of Mackay Radio and Telegraph Company, states that **T. E. Nivison** and **H. L. Rodman,** general managers, have exchanged territories. Nivison moves to San Francisco in charge of Mackay Radio's operations on the Pacific Coast, and Rodman goes from San Francisco to New York to head up the company's Atlantic Division. Both have been principal leaders in the expansion and growth that Mackay Radio has had in domestic and international radio-telegraph service, but particularly in marine service on the Atlantic, the Pacific, the Great Lakes and the Gulf; and both learned the business as ship operators.

Nivison has been a telegraph operator all his life, starting to telegraph at the age of eleven. During the next five years he continued as a railroad operator, but in 1907, in the very earliest radio days, turned his skilled operating hand to radio on Great Lakes vessels and stations. In 1909 he was placed in charge of opening a station at Toledo for DeForest Radio. The following year he was radio operator on a transpacific routing, and then shifted to the Atlantic Coast, working for Marconi Wireless on Cape Cod. At this post he had the tragic distinction of being one of the operators to communicate with the sinking Titanic, and of handling distress traffic with the rescue ships Carpathia and California.

One year after operations were begun by Federal Telegraph, ancestor company of Mackay Radio on the Pacific Coast, Nivison joined as operator at Portland, Oregon. Then he shifted to commercial work at which he was at once successful. He went to Honolulu in 1914 as commercial agent and temporary manager of Mackay Radio's station there. He became manager at Portland and then manager at Los Angeles. In 1924 he was made sales manager and marine superintendent, the phase of the business for which his experience had prepared him exceptionally

W. V. Russ.

S. W. Fenton.

well. He was transferred to New York in 1926 in charge of marine operations on the Atlantic, the Great Lakes and the Gulf. He was made general superintendent of the Atlantic Division in 1929 and has led Mackay Radio into its present position in the East.

Rodman has been equally success-

ful for Mackay Radio on the Pacific Coast. He started in 1904 as a Postal Telegraph messenger at Binghamton, N. Y., and was one of the early radio "bugs." He soon found a job as ship operator and spent two years at sea, then joined the Navy, completed the course in electricity and wireless at the U. S. Naval Electrical School at Brooklyn, and served on destroyers touching most parts of the world. In 1911, soon after the Federal Telegraph Company started operations, Rodman entered its service and remained as an operator and in charge of various stations from Kansas City to Honolulu until the World War and his return to service in the Navy. In charge of the special radio expedition that took over, completed and operated the radio station at Russian Island, Vladivostok, Ensign Rodman was commended for the manner in which this assignment was carried through. He is now lieutenant in the Naval Reserve, Special Communication Branch.

After the war he returned to Federal Telegraph and entered the commercial end of the business, for which a thorough operating background and a compelling personality fitted him particularly well. He became marine superintendent, assistant to the general manager, the late A. Y. Tuel; and finally general superintendent of Mackay Radio's Pacific Division, from which he moves to New York as general manager of the Atlantic Division.

W. V. Russ, Pacific Coast marine superintendent for Mackay Radio & Telegraph Company for the past two and one-half years, has been promoted to the position of marine superintendent of Atlantic Division with headquarters in New York.

It is with interest that we review Russ' history. He left the post of assistant U. S. Radio Inspector at Seattle to join the Federal Telegraph Company in 1926. He devoted considerable time in broadcast receiving equipment in the capacity of factory representative. He was with the Kolster Radio Corporation and had service with the Westinghouse Electric & Manufacturing Company. Prior to service in the Department of Commerce radio inspection division Russ was with the radio department of the United States Shipping Board and had previously served as radio operator at sea.

S. W. Fenton, who has served in both the operations and commercial departments of Mackay Radio's Marine Department, Atlantic Division, New York, since joining the organization in 1930, succeeds Russ in San Francisco as marine superintendent, Pacific Division.

Fenton has been connected with marine radio communications for the past 16 years. He served as chief radio officer on the maiden voyage of the United States Lines' Manhattan, then was assigned to shore duty at Mackay Radio's New York headquarters.

The Standard Oil Company of California launches the Despatch No. 7 at the Fulton yard, Antioch. Little Miss Lya Noel Rumsey was sponsor. In the launching party were Captain John Rumsey and his family (shown in illustration), Joseph McEachern, Charles Robertson, and other S. O. officials.
The towboat will be used in river and harbor barge towing service.

O'Donnell With United Engineering Co., Ltd.

Barney O'Donnell, one of the best known marine engineering and ship repair men on the Pacific Coast, is now with the firm of United Engineering Co., Ltd., engineers and machinists, and T. J. Moynihan Co., Ltd., boiler makers, headquarters, San Francisco. O'Donnell is assistant to R. E. Christy, who is manager and secretary-treasurer. H. P. Gray is president of both United Engineering Co., Ltd., and T. J. Moynihan Co., Ltd. Barney O'Donnell has been active in the San Francisco ship repair field for the past ten years.

Ed. Forrest Injured

We are mighty sorry Ed. Forrest, marine representative of The Paraffine Companies, Inc., had the misfortune of breaking a leg recently. The accident occurred in Oakland and Ed was rushed to the Samuel Merritt Hospital where he is now recovering and in much better shape. Can't keep a good man down, so Ed's friends will see him up and at 'em again before long.

Captain H. D. Clarke Retires after 38 Years Service

In ships and ports around the world friends of Captain Harry David Clarke will be interested to learn of his recent retirement following 38 years of service. Captain Clarke was Port Captain and Manager of the Marine Department at San Francisco for General Petroleum Corporation of California, a subsidiary of Socony-Vacuum Corporation.

Born in London in 1880 Captain Clarke started apprenticeship in the full rigged ship Ardnamurchan, this vessel a frequent caller at San Francisco. She was owned by Hugh Hogarth & Son. In 1899 young Clarke joined the Standard Oil Company of New York, serving as second mate and chief officer in the four masted barks Eclipse and Arrow in the Atlantic, Pacific and East Indies trade.

Next we find him in the steamers Lackawanna, Chesapeake, Delaware and Narraganset. At the age of 25 he became master of the steamer Tanawanda. From 1906 to 1913 Captain Clarke was in Pacific service between California and Oriental ports. Cargo vessels were scarce. It was necessary for tank ships to go out with oil; clean the entire ship, and come home with general cargo.

During the World War Captain Clarke commanded oil transports under jurisdiction of the British Navy. Later we find our friend commanding various Socony vessels again. In 1924 he came ashore as Port Captain at San Pedro, California. In 1926 when General Petroleum was merged with Standard Oil of New York Captain Clarke was transferred to San Francisco as Port Captain and Manager of the G-P Marine Department. From this post he retired to a deserved rest.

Captain E. M. Olson, of the Matson Line's Golden Bear, with his officers and crew, was the honor guest at a luncheon given by the San Francisco Junior Chamber of Commerce and the San Francisco Commercial Club the latter part of July.

L. M. Caldwell, assistant vice president Fireman's Fund and Occidental indemnity companies, has returned to the companies' head office in San Francisco from a week's business trip in Southern California.

Capt. H. D. Clarke.

Back piloting a passenger ship across the Atlantic, **Captain Harry Manning** of the United States Lines, who piloted Amelia Earhart to Honolulu on her first round the world attempt, is commanding the U. S. Liner American Merchant to the British Isles.

David P. Henderson, former assistant to **Captain Kirkwood H. Donavin** during the latter's post of operating manager for the Panama Pacific Line, passed away at the Mare Island Hospital on July 21. He was buried in the National Cemetery at the Presidio. He was an ex-army man and was very well liked by all with whom he came in contact.

When the American Legion party visits Europe in September, the official escort will be **James Anderson**, assistant controller of the United States Lines, with headquarters at New York. Congratulations are being sent by Western legionnaires on his appointment. The party will sail from New York on the Washington, flagship of the pilgrimage. Anderson, an important member of the Roosevelt-U. S. Lines Post 945 of the American Legion, served at sea during the World War.

Propeller Club of California News of the Month

The vacation period will soon b[e] over and Propellers can anticipat[e] some happy reunions with thei[r] "shipmates" aboard the good shi[p] when we shove off on the fall voy[age].

The Board of Governors will soo[n] determine the sailing date and an[nouncements] will go out to the crew list ahead of the first big event.

Speaking of vacations . . . some o[f] our good friends are already bac[k] with wild tales, snapshots and sun burn. Harold Weule and Howar[d] Dunbar got all the way over to Miami, Florida. They stalked tarpon of[f] the coast and 'gators in the glades returning to their California home by plane and reporting a most en[joyable] voyage.

Stanley Allen, our secretary, re[ports] the continuance of member[ship] committee activity despite th[e] summer "holiday." New names fo[r] the roster are:

- Captain J. S. Smith, S.S. General Pershing
- Captain G. E. Lindley, S.S. J. A. Moffett
- Captain Ralph Stall, S.S. W. S. Rheem.

Welcome aboard, skippers!

Again we remind our golfing mem[bers] of the fall tournament. Detail[s] of time and place will be announce[d] real soon now.

Captain Girvin B. Wait, formerl[y] assistant manager for Alexander & Baldwin, Ltd., at Seattle, Northwes[t] agent for Matson Navigation Company, has been appointed manager o[f] Kauai Terminals, Inc., at Port Allen T. H. He is president of the Propelle[r] Club, port of Seattle; was chairma[n] of the Foreign Trade Week and National Maritime Day committee i[n] 1936; and was chairman of the 193[7] Steamship Dinner committee. Captain Wait has long been a leader i[n] port affairs. He succeeds Captai[n] Lewis J. Hall, retired.

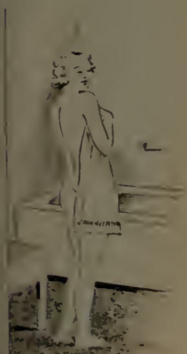
ELIMINATE THE WET FLOOR SLIPPING HAZARD

WITH ALUNDUM TERRAZZO

A wet floor need not be a slippery floor. Alundum Aggregate in terrazzo provides non-slip effectiveness that is not lessened by water.

This bathroom on the "Queen Mary" is a typical example—is but one of many places on the famous liner where Alundum terrazzo is assuring walking safety.

It will pay you, too, to use Alundum Aggregate to prevent costly slipping accidents to passengers and crew. If you prefer tile there are Alundum Ceramic Mosaic Tile and Alundum Floor Tile — two other Norton Floors products that are effectively non-slip even when wet.



NORTON COMPANY
WORCESTER, MASS.

New York Chicago Detroit
Philadelphia Pittsburgh Hartford
Cleveland Hamilton, Ont.
London Paris Corsico, Italy
Wesseling, Germany

T 454

NORTON FLOORS
ALUNDUM TILES—TREADS—AGGREGATES

Cool as a Penguin ..

At the risk of being criticized for a very badly mixed metaphor, we persist in the opinion that penguins are cool, if not actually chilly. The point we want to put over to marine engineers is simply this: that

Selby Diesel Engine Babbitt

functions in its field with the same calm coolness as penguins do in theirs! It's an especially hard, tough Babbitt, yet free-flowing; and it has an abnormally great resistance to high temperatures. Give it a try this trip!

FEDERATED METALS DIVISION

American Smelting and Refining Company

SAN FRANCISCO, U. S. A.

LOS ANGELES PORTLAND SEATTLE

Pacific Marine Personalities

After an absence of some six years, **Captain Erik Thomle**, retired commodore captain of the Fred Olsen Line, came back to pay a little visit to San Francisco during the latter part of June. He lives in Oslo, Norway, but decided to see how everything was going along in this city after so many years.

Capt. Thomle, bringing the steamer Brave here in 1915 as a trail blazer, inaugurated the steamship company's service to the West Coast. With the completion of this voyage, the Olsen Line began construction of a fleet of up-to-date motorships for Pacific Coast service. Capt. Thomle returned here as commander of the first of these new ships, the George Washington, and after a long stretch of shore duty as manager of the local office, retired for a well-merited vacation.

Word comes to us of the resignation of **Joseph F. Meseck** from I. M. M., where he had been secretary to P. A. S. Franklin since 1902. The resignation became effective on June 19. Meseck joined the Red Star Line in Jersey City in 1892, and has had a long shipping career. He will join his two sons and a brother in the Meseck Towing Line, it is announced.

The marriage on June 26 of **Harry Hunt**, popular member of Grace Line, to Miss Marie Wilson was preceded by a dinner bidding farewell to his bachelor days, which was held in a downtown restaurant by fellow associates of the groom. Hunt handles the freight business for the Johnson Line, of which Grace are agents. He has been with the line for ten years. **Clarence Nelson** was master of ceremonies at the gathering, which was attended by a large number of Grace Line men.

Fred J. Butcher, assistant secretary Fireman's Fund and Occidental indemnity companies, has been in Montana for the past two weeks on business. Mr. Butcher visited several Fireman's Fund agencies with Mark Farris, manager of the company's Helena office and many Occidental Indemnity Company agencies of Crichton & Company, General Agents.

From New York comes announcement of the election of **R. M. Hicks**, treasurer of I. M. M., to the board of directors, **P. A. S. Franklin**, chairman of the board, making the announcement.

H. B. Allen, who for fourteen years was New York District Sales Manager of The Babcock & Wilcox Tube Company, has resigned from that company to become Vice-President of John B. Astell & Co., Inc., 90 West Broadway, New York, distributor in the New York Metropolitan district of B&W Seamless Carbon Steel Boiler Tubes and Alloy Tubes, and a wide variety of other tubular products including all kinds of welding fittings.

Walter White Retires After 33 Years

Walter White, with the United Engineering Co., Ltd., organization of San Francisco since 1904 retired on July 15 after thirty-three years continuous service. White held the position of office manager and was known throughout the marine industry for his kindliness and generosity. He will continue to live in earned rest in his home port, San Francisco. The officials and personnel of the United organization presented their friend and co-worker with a gift in recognition of his splendid record of service. A. L. Engelson succeeds White as office manager.

Du Pont West Coast Expansion Program

E. L. Andrews, Jr., and George A. MacDonald announce that simultaneously with the opening of additional paint and lacquer manufacturing facilities in South San Francisco, E. I. Du Pont de Nemours & Company, San Francisco Sales Offices and Warehouse to 235 Second Street, San Francisco, the change becoming effective August 2, 1937.

The new location provides larger office quarters and warehousing facilities for paints, varnishes, lacquers, as well as other diversified chemical products manufactured by the company.

This move completes a West Coast expansion program which began when both the Seattle and Los Angeles branches were also moved to new and larger quarters during the past few months.

The Model DF-3 Radio Compass

Of interest to yachtsmen as well as commercial shipping operators is the Model DF-3 Radio Compass, a direction finder that takes bearings on standard broadcast stations as well as government radio beacons.

The operation of the instrument is extremely simple and does not require any special training or instruction, the manufacturers claim. It is provided with a visual as well as an audible indicator allowing extreme bearing accuracy. Construction is of brass throughout, eliminating the possibility of corrosion. Installation and calibration have been greatly simplified over other makes.

Said to be thoroughly tested and proven, entirely marine in design and construction, simple in operation and installation, this radio compass should fill the need for a really fine instrument at a reasonable price. It is a product of General Sound Corporation, 7030 Sunset Boulevard, Los Angeles, California.

D. S. Morrison, vice-president in New York for the American-Hawaiian Steamship Company, visited San Francisco recently on a brief business survey.

Charles L. Wheeler, executive vice-president of McCormick Steamship Company, flew to Portland recently with **Fred L. Talbot**, another vice-president, in Talbot's four-place biplane, making the 700-mile flight from San Francisco in 3 hours and 20 minutes. During their northern trip they also visited Seattle and beach points.

Pacific Shipping and Port Notes

(Continued from Page 40)

past twelve years—in the fiscal year 1930, when 6,027 ocean-going commercial ships used the waterway; in 1929, the peak year, when 6,289 transited; and in 1928, when the total was 6,253 vessels.

Of the total ocean-going commercial vessels — in which classification are only ships of more than 300 net tons, Panama Canal measurement — using the Canal during the fiscal year 1937, those from the Atlantic to the Pacific numbered 2,809, the highest southbound total since the fiscal year 1930, when 3,051 used the waterway in that direction.

The year's total transits in both directions would have been much higher had it not been for the maritime strike which paralyzed United States intercoastal shipping through the Canal during November, December, January, and a part of February.

Tolls on the ocean-going commercial ships for the fiscal year 1937 totaled $23,102,137.12, as compared to $23,479,114.21 in the fiscal year 1936, a decrease of $376,997.09. The number of ocean-going commercial vessels using the Canal in the fiscal year 1937, and the tolls paid by them, as compared with the past twelve fiscal years, is shown below:

Fiscal year	Number of Vessels	Tolls Paid
1937	5,387	$23,102,137.12
1936	5,382	23,479,114.93
1935	5,180	23,307,062.93
1934	5,234	24,047,183.44
1933	4,162	19,601,077.17
1932	4,362	20,694,704.61
1931	5,370	24,624,599.76
1930	6,027	27,059,998.94
1929	6,289	27,111,125.47
1928	6,253	26,922,200.75
1927	5,293	24,212,250.61
1926	5,087	22,919,931.89

The effect of the maritime strike during November and December, 1936, and January and part of February, 1937, on the total Canal traffic for the fiscal year 1937 is indicated in the following table of number of vessels transiting and tolls paid, by months:

Month	Number of Vessels	Tolls Paid
July, 1936	456	$1,999,105.18
August	473	2,051,540.28
September	466	2,045,440.82
October	482	2,081,758.23
November	368	1,488,054.25
December	341	1,366,388.58
January, 1937	399	1,598,323.51
February	377	1,602,306.30
March	536	2,355,149.04
April	473	2,067,026.68
May	544	2,376,706.36
June	472	2,070,337.89

Portland Port Notes

World's Record Lumber Cargo. Believed to be the largest cargo of lumber loaded upon any ship anywhere was the shipment of approximately 9,000,000 board feet which was stuffed into the spacious holds of the Andrea F. Luckenbach, America's largest freighter, at Columbia River docks during July.

When the vessel departed from Longview July 17, R. E. Piper, district manager of the Luckenbach Steamship Company, estimated the shipment was nearly 1,000,000 board feet larger than the previous record, 8,012,000 feet loaded upon the Lewis Luckenbach about 10 years ago. Freight charges alone will exceed $125,-000, and value of the lumber was placed at $360,000.

Riverboat Goes to Puget Sound. The six-year-old steel-hulled diesel-driven riverboat L. P. Hosford was sold last month by Shaver Forwarding Company to the Puget Sound Freight Lines and left for Seattle to be refitted for a new run on the Sound. She is 145 feet long, is powered by a 500 horsepower engine, and carries a modern marine elevator on her forward deck for handling freight at docks of varying heights.

Shaver Forwarding Company announced, through its manager, Lew Russell, that it had withdrawn from contract freight service on the lower Columbia River and would confine its operations to the Portland-Umatilla run after Bonneville locks reopen this fall. The company plans to build new boats or barges for this service.

Mid-Year Records Compiled. Customs receipts for 1936-37 totaled $2,461,000, a gain of 33 per cent over the previous year and 87 per cent over two years ago, and the largest receipts for many seasons. Leading imports were corn, linseed and corned beef from Arg-

British steamer loading ties at a Portland dock.

entina, Oriental linseed meal and oil, European manufactures and foreign liquors.

Export figures showed a gain of 26 per cent in values for the first 6 months of 1937, compared with the corresponding period of 1936. Scrap iron, wheat and lumber were the leading export items, the former totaling 57,000 tons for the half year. Wheat shipments abroad reached nearly 27,000 tons and lumber reached 135,000 tons.

Domestic shipments to Atlantic, Gulf and California ports also improved in general.

At the end of the 1936-37 cereal year, Portland Merchants Exchange announced that this port again led the Pacific Coast in cereal tonnage. Nearly 9,000,000 bushels of wheat and 1,730,000 barrels of flour went out on ships.

Puget Sound Shipping

H. A. Shook, Puget Sound manager for the **American-Hawaiian Steamship Company,** is authority for the statement that total cargo loadings on the vessels of his line in Puget Sound ports for the month of June exceeded the combined loadings at San Francisco and Los Angeles harbors. The figures given are: Puget Sound ports, 35,574 weight tons; San Francisco, 22,692 weight tons; and Los Angeles, 9,876 weight tons.

Heavy shipments of lumber, lumber products, canned goods, and grain are moving in the intercoastal trade.

Puget Sound Pilots early in July moved their headquarters to the 23rd floor of the Smith Tower, Seattle. This new office commands an unobstructed view of the entire harbor of Seattle and adjacent Puget Sound waters. Here the veteran pilots gather to await calls for duty which may send them to the outports to board ships coming in from sea, or to the docks to guide ships out to sea or to other Sound ports.

Henry Blackwood, Collector of Customs for the Puget Sound district, has recently been retired after 40 years in the U. S. Customs Service. He came to Seattle in 1887, joined the Customs Service at Port Townsend in 1897, and moved with that service to Seattle in 1913. He will be succeeded by Roy L. Ballinger, Chief Inspector.

The North West Terminal Association, which includes all ports in the Pacific Northwest, has announced a new schedule of tariffs on commodities and services in transit on terminals, to take effect July 30.

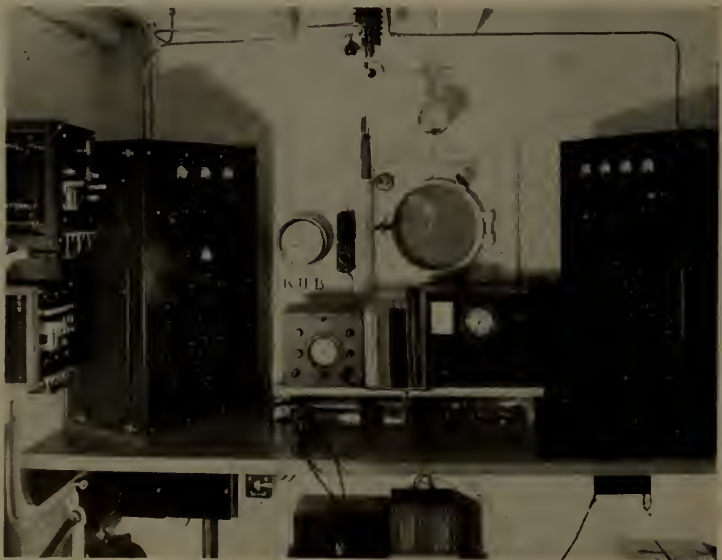
Wharfage remains unchanged. Services involving labor will bear an average increase of 10 per cent. Demurrage charges will be raised to avoid congestion.

A World's Fair at Seattle in 1942, to cost $40,000,000, is proposed by the Seattle-Northwest Centennial Exposition, Inc., to commemorate the 100th anniversary of the opening of the West to settlement and the completion of the Grand Coulee Dam.

Associated Stevedores Inc., a new firm, has purchased the Port Townsend Stevedore Company, of Port Townsend, Washington. William Brady, president of Brady-Hamilton Stevedores, Portland, Oregon, is president of the new firm.

Charles B. Wheeler of San Francisco, executive vice president and general manager of the McCormick Steamship Company, was guest speaker on July 19 at a luncheon meeting of the Seattle Industrial Traffic Managers' Association. He gave an excellent talk on present world conditions and their effects on American shipping.

A. B. Natland, district manager at Seattle for Alexander & Baldwin, agents for the Matson Navigation Company, reports that during the last half of July seven Matson freighters departed from Pacific Northwest ports for Hawaii with more than 10,000,000 board feet of lumber.



View of Mackay Radio & Telegraph Company's installation in Coos Bay Lumber Company's well-known carrier S.S. Lumbertown. Equipment consists of intermediate and high frequency transmitters together with all-wave receiving equipment of the latest design which fully complies with recent regulations passed by the 7th Congress. This equipment provides communication facilities direct to any point in the world. Thus radio "sails on!"

Mackay also announces installation of complete new equipment on the following: 10 vessels of the Swayne & Hoyt, Ltd. fleet; 3 ships of Gulf Pacific Mail Line Ltd.; 6 of the Coastwise S.S. Company; and 6 of Sudden & Christenson.

Wages and Sling Loads

(Continued from Page 39)

Rags, large (Above 700 lbs.) 2 bales to sling load
Rags, medium (500 to 700 lbs.) 3 bales to sling load
Rags, small (below 500 lbs.) 4 bales to sling load
Sisal, large 3 bales to sling load
Hemp, ordinary 5 bales to sling load
Jute (400-lb. bales) 5 bales to sling load
Pulp, bales weighing 350 lbs. or more 6 bales to sling load
Pulp, bales weighing 349 lbs. or less 8 bales to sling load

(Note: With respect to loading where the loads have been built by other than longshoremen, the employers will make arrangements for the application of this rule as soon as possible and in any event within 60 days from the date of this agreement).

Steel drums, containing Asphalt, Oil, etc., weighing 500 lbs. or less 4 to the sling load
(When using Chine Hooks)

Steel drums, containing Asphalt, Oil, etc., weighing 500 lbs. or less on board (capacity of board—1 tier) maximum of 5 drums to sling load

Barrels, wood, heavy, containing wine, lard, etc., maximum of 4 bbls. to sling load
(When using Chine Hooks)

Barrels, wood, heavy, containing wine, lard, etc. (capacity of board 1 tier) on board—Maximum of 4 bbls. to sling load

Barrels, wood, containing Dry Milk, Sugar, etc. 6 bbls. to sling load

(Present port practice or gear in handling drums of asphalt or barrels shall not be changed in order to increase the load).

Newsprint, rolls 2 rolls to sling load
Newsprint, rolls 1 when wgt. 1800 lbs. or over

(5) SACKS

Flour—140 lbs. 15 sacks to sling load
Flour— 98 lbs. 20 sacks to sling load
Flour— 49 lbs. 40 sacks to sling load
Flour— 49 lbs. (in balloon sling) 50 sacks to sling load
Cement 22 sacks to sling load
Wheat 15 sacks to sling load
Barley 15 sacks to sling load
Coffee—Power haul from and to ship's tackle 12 sacks to sling load
Coffee—Hand haul from and to ship's tackle 8 sacks to sling load
Other sacks—maximum 2100 lbs. to sling load

(6) When flat trucks are pulled by hand between ship's tackle and place of rest on dock, load not to exceed 1400 lbs.

(7) Number of loaded trailers (4 wheelers)—to be hauled by jitney as follows: Within the limits of the ordinary berthing space of the vessel—2 trailers.

Long hauls to bulkhead warehouse or to adjoining docks or berths—3 trailers.

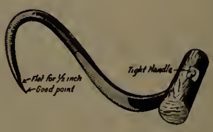
Extra long haul to separate docks or across streets —4 trailers, providing that four (4) trailers shall be used only where it is now the port practice.

(8) When cargo is transported to or from the point of stowage by power equipment, the following loads shall apply:

48—1 talls	40
24—1 talls	60
24—2's talls	48
24—2½'s talls	40
6—10's talls	50
6—12's talls	50

(9) This agreement is supplemental to said agreement of February 4, 1937, and is hereby made a part thereof.

The purpose of the parties in negotiating this scale of maximum loads for standard commodities, is to establish a reasonable loading and discharging rate under the working conditions applicable to the operation, including the number of men used. It is agreed that the employers will not use the maximum loads herein set forth as a subterfuge to establish unreasonable speed-ups; nor will the I. L. A. resort to subterfuges to curtail production.



Naval Training for Seamen

(Continued from Page 16)

with known capabilities for war service. The shipping lines will benefit by the increased efficiency of its personnel for peace time operation of their vessels. The individual officers and seamen will benefit by obtaining training for their mobilization stations with the Navy. All members of the Naval Reserve are, by law, a component of the Navy. Also, while on training duty, they have the same status and receive benefits available to regular Navy personnel and, in addition, such benefits as are by law prescribed for the Naval Reserve, such as compensation for injuries, the right to Government insurance and medical attention with hospitalization. Except in time of war or national emergency, Navy Reservists cannot be ordered to active duty except with their own consent. While in an inactive duty status they retain their usual rights as private citizens.

San Pedro's Water Taxis

Since 1922 the H-10 Water Taxi Company, Limited, has had an exclusive franchise covering the transportation of persons from the San Pedro waterfront to ships at anchor in Los Angeles-Long Beach harbor. This company, organized by F. O. Vail and Ernie Bartell, its present executives, have built up a fleet of 17 boats. The H of the title stands for home port men and the 10 indicates the number of such men financially interested in the company.

This company has had a very successful career. On 25 cent fares it has collected as much as $195,000 in a single year, and in addition has taken in $35,000 on special charter business.

Since the boats must be continuously ready for service, night or day, run on a fast schedule, they are built for rugged dependability, and are equipped with heavy duty continuous service engines. An average of eight stops to pick up passengers and an 11 mile circuit must be covered in 60 minutes.

Recently this company has found it advantageous to change over to the diesel engine, and in the process have uncovered some rather remarkable profits arising from that conversion.

The conventional water taxi is 47 to 50 feet long, with permanent enclosure forward and canopy top running aft. Seats are arranged for 50 to 60 passengers. The engines, as a rule, have been six to eight cylinder gasoline units ranging from 175 to 275 horsepower. The average gasoline bill for the heavy six year period before the depression ran $6,000 a month. Spark plug purchases alone have run as high as $300 a month.

Since 1927 the company has flirted with the diesel engine idea and has purchased several engines as experimental power plants. These engines, however, were all too heavy for the hulls. Recent progress in land transport diesels revived the diesel idea, and last November H-10 Water Taxi No. 9 was equipped with a Cummins H. M. R.-125 H.P. diesel, replacing a 175 H.P. gasoline engine.

This unit saved 800 pounds in weight over the gasoline motor, and on account of its steadier torque lost only a little over one-half knot in speed.

The testimony of the executives of the Water Taxi Company shows that:

With gasoline engine, No. 9 burned 17 gallons of gasoline an hour on a 20-hour day, costing $35 a day for gasoline alone.

With the Cummins diesel, No. 9 burns four gallons of fuel per hour, at 3½ cents a gallon, costing $2.80 per 20-hour day.

In addition, the gasoline engine consumed 14 gallons of lube oil a week and the diesel only 5½ gallons.

The owners, therefore, figure that the diesel will save enough to pay for itself in every 100 days of operation.

So pleased were they with this performance that they have ordered 16 more Cummins diesels to complete the conversion of their entire fleet. Several of these diesels are already installed and in satisfactory service, and others are in process.

Building in American Yards

(Continued from Page 48)

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L.O A. 184', L.B.P. 163', beam molded 35', depth molded amidship at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launched June 22, 1937; delivery date, September, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively. Keel laid for first ship May 20, 1937.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

DRYDOCK AND ROUTINE REPAIRS: **Barge Roddand, Tug Hilton, Yacht Ohbee II, Tug Hamilton, Tug G & E No. 1, Tug Baldrock, Rob't E. Lee, Pilot Boat Wm. D. Sauver, Lighter No. 17.**

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date September 18, 1937; delivery date October 2, 1937. No. 162, launching date October 16, 1937; delivery date November 6, 1937.

Hulls No. 163, 164, and 165, three diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 163, keel laid December 1, 1936; launched June 5, 1937; **delivery date August, 1937.** No. 164, keel laid December 15, 1936; launching date October, 1937; delivery date November 1, 1937. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; keel laying date September 15, 1937; delivery date, September, 1938.

Hull No. 170, one single screw steam tanker for Bernuth, Lembcke Co., Inc., New York; length 462' 4"; beam molded 65' 0"; depth molded 35' 0", DWT approximately 12,900 tons. Keel laying date October 23, 1937; delivery date June, 1938.

TAMPA SHIPBUILDING & ENGINEERING CO.
P. O. Box 1838
Tampa, Fla.

DRYDOCK AND ROUTINE REPAIRS: **Cuba, Railroad Car Ferry Joseph R. Parrott, Yacht Alva, U. S. Hopper Dredge Absecon.**

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery indefinite.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively. 840 and 841 launched May 7 and June 3, 1937; 842 indefinite; estimated delivery indefinite.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W. L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 14, May 24, and June 17, 1937, respectively; launching and delivery date indefinite.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6'. Keel laying date, June 10, 1937; launching and delivery dates indefinite.

CRANE PLANT
27th Street, Brooklyn, N.Y.

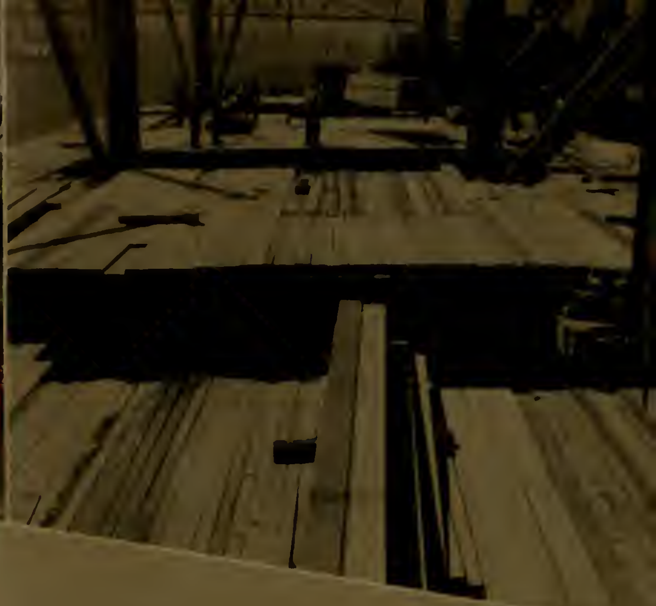
Hull No. 849, ferryboat John J. Walsh, for the Westchester Ferry Corp., Yonkers, N.Y. LOA 153', beam, extreme, 48', depth 14' 6". Estimated keel laying May 24, 1937; **estimated launching, August 23, 1937;** estimated delivery, September 12, 1937.

Seattle Firm Building Tug and Barges

Winslow Marine Railway & Shipbuilding Company, Inc., of Seattle are building three barges and a tug for the Howe Sound Company. The barges are to have a length of 80 feet and the tug a length of 56 feet, and they will be used in the transport of copper ore. H. C. Hanson of Seattle is the designing and supervising naval architect.

PACIFIC MARINE REVIEW

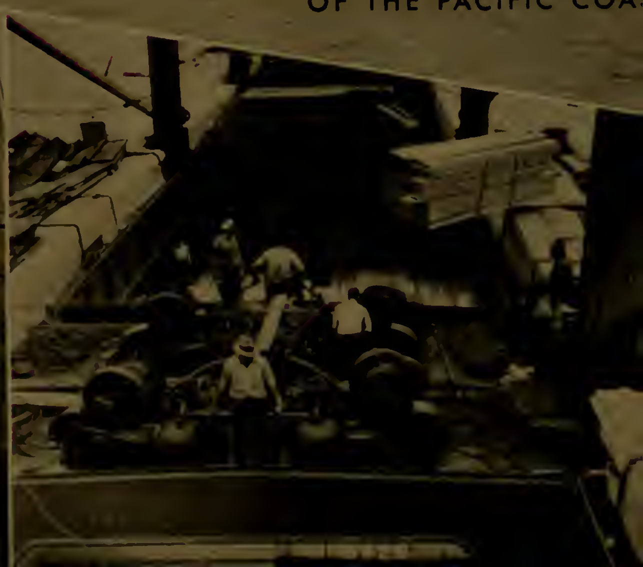
SEPTEMBER
1937



Official Organ

PACIFIC AMERICAN STEAMSHIP ASSOCIATION

SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

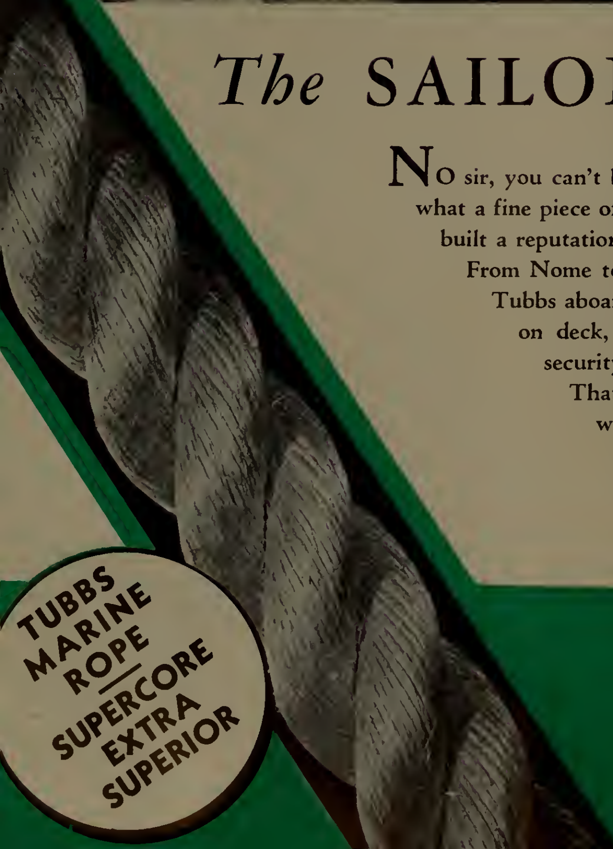


The SAILORMAN'S FRIEN

No sir, you can't blame this Sailorman for demonstrating (with a lover's n what a fine piece of cordage it is. For, naturally, it's Tubbs Rope that ha built a reputation in the movies.

From Nome to San Diego, the Pacific Coast Sailorman knows that wh Tubbs aboard it is all fair sailing as far as rope is concerned. For th on deck, the one who actually handles the rope, realizes the g security that Tubbs Marine Rope offers. He knows that it is str That it lasts longer. That it is more pliable and easier to h wet or dry.

There are two types of Tubbs Marine Rope, SUPER and EXTRA SUPERIOR MANILA. Specify o both, depending on your rope requirements. Bot give you many extra dollars worth of depe service.



• TUBBS •
Cordage Co.

PACIFIC MARINE REVIEW

SEPTEMBER, 1937
VOL. XXXIV NO. 9

CONTENTS

Our Cover

Our cover on this issue is made from photographs of the intercoastal cargo liner Andrea F. Luckenbach loading and on her way with the largest single cargo of lumber ever carried on a vessel.

The Andrea F. Luckenbach is:
527' 6" length overall
68' 0" beam
and with this load of lumber she had an average draft of 29 feet 7⅛ inches.

Her master is Captain Henry Hill and her Chief Engineer J. H. Bairstow.

This record load of lumber contained 4,911,000 board feet, of which 1,590,000 board feet was carried on deck and the balance in holds and 'tween decks. The cargo was loaded from five docks on the Columbia River and delivered at New York, Providence, and Poughkeepsie.

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J. S. Hines	B. N. DeRochie	Alexander J. Dickie	Paul Faulkner	F. Dryden Moore
President and Publisher	Assistant Publisher	Editor	Advertising Manager	Assistant Editor

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PACIFIC MARINE REVIEW

VOLUME XXXIV SEPTEMBER 1937 NUMBER 9

Pacific Coast Yards and
The New Shipbuilding Program

Much recent publicity has been given to the replacement program proposed by the U. S. Maritime Commission. This program was presented to the House Appropriations Committee by the chairman of the Maritime Commission, who asked that the Committee include in its Third Deficiency Bill an authority for the Commission to make commitments on shipbuilding contracts up to $150,000,000. Such an inclusion was attached to the bill and the bill was passed by Congress on August 21.

This gives the Maritime Commission a free hand to go ahead with its shipbuilding program. Anticipating this action the Commission, on August 13, ordered all American steamship operators who were operating under subsidy agreements to have ready by September 1, 1937, their complete detailed plans for building and for financing replacements to their ships. This order is practically impossible to fill in the time allotted. However, our interest here is with the very evident determination of the Maritime Commission to begin a replacement program as promptly as possible.

In testimony before the Appropriations Commitee, Joseph P. Kennedy, chairman of the Commission, outlined a very definite program calling for the construction of 225 to 250 vessels costing $520,000,000 during the next five years.

The initial unit of this five-year program has now been authorized by Congress. It involves 95 ships, to cost $256,440,000, and "contemplates orderly construction over a period of 18 months to 3 years."

The following statement shows the types, numbers, and cost of vessels proposed for this 95 ship program.

46 cargo vessels	$58,880,000
14 cargo vessels	19,040,000
10 passenger and cargo vessels	40,000,000
10 passenger and cargo vessels	55,000,000
4 passenger and cargo vessels	40,000,000
1 special Manhattan type passenger liner	15,000,000
10 tankers	28,520,000
Total 95 vessels	$256,440,000

The estimated total deadweight capacity of these 95 ships is 835,000 tons.

Of this total program it is estimated that there will come under shipbuilding subsidy, as built for private shipowners, vessels to cost $109,760,000. Of this sum the shipowners' share would be $27,440,000 and the Commission would pay outright and loan a total of $109,760,000. The balance of $146,000,000 in the total program is to be in direct orders for ships to be owned by the Commission and chartered to private owners for operation under Title VII of the Merchant Marine Act of 1936.

Pacific Coast shipbuilders have a 6 per cent differential in bidding on any of the ships of this program if such ships are to be owned on and operated from the Pacific Coast. It is impossible from the data to determine exactly the proportion of this program on which this 6 per cent differential will apply.

However, Pacific Coast shipbuilders do have a fighting chance on all that part of this program which comes within their capacity, and we would estimate that at 80 per cent of the total, or better than $200,000,000.

On the 6 per cent differential bidding the Pacific Coast shipbuilders ought to get about 20 per cent of the total, which would make be·ter than $50,000,000 worth of ships.

Storm Clouds

A constructively critical analysis of the Merchant Marine Act of 1936 with special reference to its effect on the American Merchant Marine in transpacific cargo and passenger service.

By E. E. Johnson

A CRITICAL survey of the legislation now controlling the American merchant marine reveals several very interesting possibilities with an especial bearing on the American participation in cargo and passenger transport on transpacific trade lanes. During the past decade competition along these lanes has become very keen and the American ship operator finds the going increasingly difficult.

Like the Acts of 1916, of 1920, and of 1928, the 1936 Merchant Marine Act proclaimed that we are to have a fleet of modern, economic and suitable ships to foster our overseas foreign trade and to provide safety in time of national stress. Let us review these former Acts and take stock of our position.

In 1914 we had only seventeen ships in overseas service and were almost completely dependent upon foreign tonnage for transportation. This resulted in practical bondage as to what we were to sell and ship. With the advent of the World War, these foreign ships were withdrawn for war purposes and we were left on the beach.

This demoralized sea transportation and forced the 1916 Act and the creation of a Shipping Board to find shipping for the relief of an intolerable situation. Entering the war we were forced into an orgy of building war emergency ships which perforce bore no relation to economy of building and operation or to the future use of these ships in competitive international commerce. We built at that time about 2,600 ships of nearly ten million gross tons costing about three and one-half billion dollars. Compare this figure with the value of one and one-half billion dollars set by London authorities on the entire world fleet of some forty-nine million gross tons.

The 1920 Act sought to settle America in its rightful place as a world sea power and to eliminate Government ownership and operation. Timid landsmen failed to grasp the economic factors involved and the act failed of its purpose. Meanwhile, some 1350 slow and fuel eating freighters with a mere handful of faster ships were placed on regular trade routes and performed valuable services. For fifteen years before the World War we averaged three billion dollars foreign trade per year, and during the war years seven and one-half billion, but the fifteen years after the war, including the depression years, gave us an average of eight billion dollars foreign trade per annum.

● Shipping Board Operation

Shipping Board operation, however, did not provide for any replacements or refinements as to new types of ships in accordance with the requirements of the trade. For instance—the Pacific Coast-Europe services require ships with fair speed, some passenger accommodations, and large refrigeration capacity. We had no such ships, so the European nations flocked into the trade with eighteen lines and now carry about ninety-six per cent of the business. Yet that trade is the most essential to the Pacific Coast grower and producer. Another war in Europe would have a tendency to stop this valuable outlet almost completely. Anyway, we built no new ships while the nations in Europe and Japan started a feverish campaign of shipbuilding. The motorship idea took a tremendous leap,

over the World's Greatest *Shipping Lanes*

growing from 216,000 gross tons in 1914 to 12,500,000 gross tons in 1936. We, an oil producing nation, did little to foster this economic mode of propulsion.

Sleek foreign motorships with low cost operation slid by our thumping freighters and soon we were reduced to less than five hundred ships in overseas trade. Ere long America of the glorious seafaring tradition of the Clipper ship, with a heritage of the sea second to none, and with natural seacoast resources unequalled elsewhere, fell into last place among sea powers as regards ships of ten years or less, and fifth place as regards vessels of 12 knots and over, and was faced with a fleet of ships rapidly passing the useful age mark. Economically these ships were obsolete when foreign nations built 3 to our one in number and 18 to our one in tonnage.

In 1925 we took stock, determined we were to have a Merchant Marine, and after long debate passed the 1928 Act. Low interest loans for building, and mail contracts for operation were provided. Forty-two high class combination freight and passenger vessels were built; the investment by private owners in these new ships being 155 million dollars. But for the world-wide depression and the tactical searching investigation into air mail and ocean mail contracts of 1932, we undoubtedly would have built more of these splendid ships. Justified or not, loans for construction were stopped and we again paused to take stock. We found that some advantages had been won, but also that we had disregarded the widely different economic factors in the various trades.

● Competition on the Pacific

In the Pacific, where the Japanese operate with highly efficient and very economic labor, or where other foreign ships operate with a few white officers and extremely low paid Oriental help — Chinese and Lascars, our ships face a stiffer competition than they do in the Atlantic where they cope with advanced European nations whose wage scale and living conditions are more equal to our own. Thus the Atlantic operators received too much or just enough, while the Pacific operators received too little for proper growth. The mail contracts, based upon size, speed and mileage, were not scientifically correct when applied to all alike. All this was explained in 1925 at the hearings on the 1928 bill.

From these and other causes our shipbuilding stopped completely while foreign governments spurred national shipping plans by the issuance of low interest loans, scrap and build bounties, increased mail contract subsidies, penetration subsidies, tramp ship subsidies, reorganization loans and restriction acts reserving the carriage of goods and passengers to national vessels.

After much debate and exhaustive hearings we rushed through a last minute bill in 1936 which, because of its radical departure and restriction feature, may prove of far reaching effect and possible boomerang proportions. Popularly we set out to destroy the mail contract camouflage. A spade was to be a spade. Now we have two outright subsidies. Both are designed to give parity or "competitive equality." Let us analyze them and try to answer that question.

TRANSPACIFIC COMPETITION

Shipbuilding labor:

Japan pays 5.6 cents an hour.

America pays 74.8 cents an hour.

Shipbuilding subsidy:

America pays up to one third American costs.

Japan pays as high as more than half of the Japanese costs.

Net shipbuilding cost to owner on combination cargo and passenger liners under these subsidy systems would be:

To Japanese owner: $50.00 to $75.00 per gross ton.

To American owner: $175.00 up per gross ton.

Cost of operation of low cost Japanese ship is less than 25 per cent of the cost of operation of the high cost American ship.

Japan is now building fifty or more fast cargo vessels and combination cargo and passenger liners for transpacific and Asiatic coastwise operation.

America is not building a single vessel of these types for transpacific operation.

United States Lines' transatlantic passenger liner Manhattan and her sister Washington are now the only representatives of the American merchant marine among the many first class liners on the Atlantic.

● Construction Subsidies

First we have the construction-differential subsidy whereby the American shipowners are to be placed on parity as to original investment in ships. This is limited to one-third of the original cost of the ship; or, if four out of five Commissioners agree, it may be increased to fifty per cent. Practically this is paramount to a one-third limit. Such a limit is undoubtedly satisfactory as regards large passenger ships where constructing is limited to big shipyards and where standardization is least effective. But with the more useful types, the combination freight and passenger liners, the cargo liner, or the purely freight ship the one-third differential will not afford parity. Presently there is a shipbuilding boom on in Europe and Japan and boom prices are not indicative of comparative costs. But even so, the smaller and highly efficient European shipyards specializing in certain types of vessels and greatly standardized, can easily underquote our limitations. These yards are available to the foreign owner and after all, it is the competitive cost of particular ships that count, not the type of shipyard where they were built. The cost of a ship is represented by about fifty per cent for labor in the shipyard. If labor on material and transportation is included labor represents about eighty per cent of the total cost of the ship. Thus labor relations to international parity in cost of ships can be readily seen from figures on comparative wage rates. These show:

United States	74.8c per hour (now more)
Great Britain	31.5c per hour
Germany	21.9c per hour
Italy	17.3c per hour
Japan	5.6c per hour

Japanese Trade and Industry, 1936 (Page 294), states:

"Both in design and construction, Japanese shipbuilding technique has now reached a high degree of efficiency and originality," and on Page 296, "Thus the advance in cost of materials was compensated by an enhancement of efficiency and there has been no marked advance in the cost of production. "

● Japanese Building Program

Recent advices state that the Japanese Government has granted a construction subsidy to the Nippon Yusen Kaisha of Yen 20,680,000 to build seven ships with a minimum speed of 19 knots of a total gross of 94,000 tons, or Yen 220.00 per gross ton.

The Osaka Shosen Kaisha is stated to have been granted Yen 12,320,000 to build five ships of 56,000 gross tons, again a grant of Yen 220.00 per gross ton.

Assuming that this type of a ship cost a total of Yen 400.00 per gross ton (very high for Japan), the cost to the Japanese owner would be Yen 180.00 or $50.40 per gross ton. From the latest bid in America this speedy type of ship would undoubtedly cost about $250.00 per gross ton. That is the competition we face in the Pacific.

This is a national program of first magnitude. The Japanese know what they want and do it. They have just about completed two programs of modernizing their overseas fleet and are reported to be setting out on another program of 500,000 gross tons of modern economic and fast ships. All due respect to them. They are in this to provide fast and frequent transportation for their steadily increasing export business, and to guarantee their sinews of national defense. Says the Japanese Trade and Industry, 1936 (Page 468): "The importance of the shipping industry to a maritime nation is paramount"; (Page 300): "The Government introduced the Ship Improvement Plan with the object of scrapping old ships and replacing them with new tonnage, through the grant of subsidies." "The very high speed of these ships is due to a fundamental change in ship form and to improvement in propulsion machinery"; (Page 301): "Recent progress in shipbuilding technique has brought about a lowering on construction costs . . . steel is now supplied by domestic production."

The 1936 Merchant Marine Act

provided for a Maritime Commission of five members and five commissioners of splendid qualifications are now functioning. Belated as were their appointments, they are faced with a superhuman task, beset with labor troubles and difficulties without end. The 1928 Act provided for ten-year mail contracts under which the owners built ships and expanded. These contracts, regardless as to period yet to run, were all cancelled as of June 30, 1937. The law seems to take it for granted that there are always tremendous profits in shipping and there is seemingly a tacit belief that now we are to secure much more for a great deal less than the cost of the old mail contracts. Facts seem to point strongly in the other direction.

● **Operating Subsidy**

The law states that henceforth there is to be parity for the American shipowner. Parity with what? Parity with the most substantial direct competition. And in the Pacific this substantial direct competition is Japanese competition.

Certainly, we also have British competition, but so far as total wages and subsistence is concerned, there is little to choose from. The higher pay of the British officers is offset by the lower wages and food costs to the Chinese and Lascar crews. And as to repairs and maintenance, both the Japanese and British have access to the low cost repair labor of China and cheap supplies, use of which by the American ship is illegal.

Thus, in the Pacific, with Oriental help, the cost of labor and subsistence of Japanese and British ships is only about twenty-five per cent of such costs on American ships when an all American crew is used. Further, the question of overtime, whether legitimate or otherwise, is becoming a serious matter on American ships, while this issue is practically non-existent on foreign ships in Pacific trades. In the matter of repair and maintenance the percentage differential is almost as great, in fact, decidedly so since the advent of rising prices and labor costs.

For maritime labor, under these circumstances, to petition Congress to pay no ship subsidies is tantamount to economic suicide, American ships cannot secure more for freight or passage than a like foreign ship in the same trade. These costs must come from somewhere. No private owner can meet these bills and continue in business. And if we have Government ownership and operation that issue must be met just the same, plus a waning interest in development and a point of divided responsibility. We had an excellent example of this during Shipping Board days, when costs soared to fifty and more millions per year, and when no provision was made for replacements. Decidedly, this is not a period for another costly experiment. Today we do not have a war emergency to lean upon.

● **New Ships Needed**

The 1936 Act stresses greatly the need of new ships. This is a paramount issue, and decidedly so. Ships must be built and built soon if we are to even hold our own. In the halcyon days of the Packet ship and the Clipper ship we carried about ninety per cent of our own overseas trade and also some of the trade of foreign nations. With the Civil War and the westward trend and the advent of the steamer we faded out of the sea picture.

In 1914 we carried less than ten per cent of our foreign trade and overseas a great deal less. Today we carry about nineteen per cent of our

Dollar Line flagships President Hoover and President Coolidge are maintaining schedules across the Pacific under very heavy handicaps and against the keenest competition from Japanese and European lines.

exports and about thirty per cent of our imports, which shows that foreigners favor their own ships for their imports. For a nation with the most developed and most extensive sea coasts this is a sorry picture. We have conquered the West. Today our frontiers are the two coast lines facing the Atlantic and the Pacific. The sea is our heritage. Back to the sea we must go. The economic welfare of about ten per cent of our population depends upon our foreign trade and the sea.

So we return to the building requirements. The law states that the Commission may approve plans and build ships and simultaneously sign contracts with owners to purchase these ships at, say, one-third off the original price. The owner, or purchaser, must put up one-fourth of the original cost; thus:

Original price, say..	$8,000,000.00
One-fourth down	2,000,000.00
Purchase price	5,333,333.34
Balance over 20 years at 3½%......	3,333,333.34

Now assume that the owner must have at least six new ships to maintain his present service. From what source is he to get his necessary twelve million dollars? He has very recently gone through the worst depression the world has ever seen. Freight rates and passenger fares have been down to and below the cost of operation. The owner has had to use his reserves and in some instances there are deficits. Strikes have held back recovery, and now costs have held pace with gains in freight and passenger earnings.

● **Capital is Cautious**

But that is not all. Investors look askance at labor troubles and question earning capacity under the new law and its extremely restrictive safety measures. They ask "What interpretation is the Maritime Commission going to give to the question of parity? Will they do what the law states; parity with the most substantial direct competition or will it be some arbitrary parity based upon political expediency—a sort of average of all ships in all trade? In such case there will be no parity—just a hodge-podge of near equality in all trades. Such an interpretation will only repeat the error of the mail contracts. And, by the way, what about the lower subsidized construction costs and the operating subsidies paid by foreign governments? Will they be met? No, until this is further clarified you cannot have our money. We can do better in other investment fields where the risk is not so great, and where the competition is not so severe."

● **Obligations Under Subsidy**

The law requires a guarantee of continuous and regular service. It states that after certain exigencies the owner may pay a dividend of ten per cent on the capital necessarily employed. It assumes that there usually will be profits to pay this dividend, but it does not guarantee it. If, after further exigencies set up, there are additional profits, the Government splits fifty-fifty with the operator. For this reason there should be no hesitancy about assuring absolute parity with direct competition, no matter how severe. The recapture clause is effective.

If there are too many losses unde the arrangement the Maritime Con mission may permit withdrawal c the ships; but these ships may b specially built for that particula trade and not suitable in other se vices available. Then what? Th owner has the ships, or a good equit in them. What will he do with them The law prevents him from enterin other offshore trades thus competin with other American owners. H cannot sell the ships to foreign owr ers. He is limited to the America market. He might, of course, take loss of his equity and turn the ship back to the Government. But suc procedure does not build up an Am erican Merchant Marine. The answe is in the law itself. Absolute parit with direct foreign competition, b that what it may, American owner need no more than that. They do no want more than that. But parity the must have. That maxim holds gooc whether it is Government or privat ownership and operation.

Under the law there must be n

Oceanic Line operates its white beauties Monterey and Mariposa over the long trek to Australia and New Zealand under increasingly heavy competition.

Japanese motorships built by cheap labor, and enjoying heavy Government subsidies both for building and for operating, are equipped with every modern luxury for passenger service and with ample power for high speed schedules.

subsidiary companies unless specifically permitted by the Maritime Commission and then the profits from such subsidiary companies must be enfolded within the steamship company and such profits eventually shared fifty-fifty with the Government. Let's see what injustice this may create. During the sailing ship era, a famous firm extended its operation into foreign countries. These countries had no transfer or transportation facilities. The firm had to build warehouses, piers into the open ocean, furnish lighters, tugboats, trucks, even railroads. As business grew other trading companies and shipping firms began to use these facilities. The foreign governments took steps to make them public carriers or service companies. They are great assets to both the American company and to the ports and countries they serve. Now our law states that these subsidiaries cannot serve others, just the company owning them and the profits must be enfolded within the steamship company. This, then, goes contrary to the public demand and of the foreign country involved.

Undoubtedly, proper cognizance will be given this situation, but such restrictions serve to keep cautious capital out of this steamship investment field and have a tendency to force Government building, ownership and operation. If this takes place we might find great difficulty; first, because we have no war emergency to force a shipbuilding issue; second, because the tendency will be to stress naval or military requirements over the economic needs and thus build ships less suited for competitive trading; and third, because this would again raise the country wide objection that we found in the years after the war to Government ownership and operation and would thus create a lag in continuous building of suitable ships and the eventual sale at cheap prices to private operators and the whole thing to be done over again.

● Long Range Cooperation

As we view it, a long range cooperative and sustained effort must be made to keep what we have, build on this foundation, and replace our old ships with ships specially suited for each trade—all based upon actual parity in each competitive field, so that the private owner may look ahead during the economic life of his ships and plan and prepare to replace them regularly. Such restrictive features as are found too burdensome must then be certified to Congress with a recommendation for removal or revision, and labor must find its proper level by service under American conditions to the end that Americans may be proud to ship and travel on American ships. Anything less will again drive American ships off the ocean.

This is the first of a series of articles analyzing the effects of the new Merchant Marine Act and other shipping legislation on the American merchant marine on the various international trade routes.

By Sea and Air Over the North

A Brief Survey of that Northwest End of the North American Continent, which is Uncle Sam's Last Frontier

The pictures which illustrate this article and which form the background for a brief treatise on the great territory of Alaska were brought back by Dana Fuller from a trip by sea and air to contact the Northwestern Canadian and Alaskan representatives of W. P. Fuller and Company of San Francisco. This trip covered: the sea lanes from Seattle to Ketchikan, Juneau, and Cordova, on the steamer Yukon of the Alaska Steamship Company; the unloading and assembling of the airplane at Cordova; the flight across and around Alaska, including Seward, Anchorage, Matanuska Valley, Fairbanks, Circle, Woodchopper (a mining camp on the Yukon River), McCarty, and Dawson; and the homeward flight over Canada, stopping at White Horse, Telegraph Creek, Hazelton, Prince George, Vancouver, B.C., and so on home to San Francisco.

This Alaska is a very fascinating place to many tourists—a place of boundless possibilities to the old sourdough trail mushers who have pioneered and are pioneering her outposts—an experimental ground in conservation of natural resources to Uncle Sam's bureaus in Washington—a constant lure to lovers of natural beauty and to prospectors for hidden gold mines. Consider a few figures. With an area of 586,400 square miles, the 1930 census gives Alaska 59,278 inhabitants, nearly 10 square miles per inhabitant. Of this population 28,640 are listed as white, 29,983 Indian, and 655 miscellaneous. Between 1920 and 1930 this population had increased by 4,242, less than 8 per cent in 10 years.

Alaska stretches from 132 West Longitude in a westerly direction to approximately 172 East longitude and from 52 North Latitude to the North Pole. Because Alaska is part of the United States of America we are bounded on the West by the Union of Socialist Soviet Republics and separated from that enormous aggregation of commonwealths by only 54 miles of sea water. The Aleutian Islands, that 1200 mile chain which forms the southern boundary of the Bering Sea, enable us to repeat with some show of truth the proud boast of Britain that "the sun never sets on our dominions," for in midsummer as the sun goes down at Attu, westermost outpost of the Aleutians, he has already risen on the east coast of Maine.

Alaska, including its islands, has a coast line of 26,364 miles and many excellent harbors. Into these harbors every year some 4000 vessels of 1,500,000 gross tons enter from Canadian and U. S. ports. Its principal river, the Yukon, is navigable for 1200 miles. Its mountains include the highest peaks on the North American continent, Mt. St. Elias, 18,024 feet, and Mt. McKinley, 20,300 feet.

Alaska has some almost unrivaled natural wonders in its national monuments, national parks and national forests. The largest bears, the greatest glaciers, the most active volcanoes, the greatest diversity in climate, the most valuable salmon fisheries (the canned salmon pack last season was worth over $44,000,000), the largest reindeer herds, the most valuable seal rookeries—these are a few of the Alaskan superlatives.

To the stubborness of W. H. Seward, Secretary of State, who held out against great pressure for its purchase from Russia in the treaty of March 30, 1867, the United States

Pacific Coast

...wes its possession of this treasure. Seward was lampooned and caricatured by the papers of those days as a senile idiot playing with seals. The new purchase was characterized as Seward's Ice Box or Seward's Folly.

Consider the record:

Price $7,200,000.

Returns (estimated totals):

From gold, silver, and copper	$750,000,000
From fisheries	$1,000,000,000
From furs (land)	$70,000,000
From furs (seal)	$20,000,000

Assets on hand include: recoverable gold deposits variously estimated from 400 million to a billion; increasingly valuable and carefully conserved fur and fishery resources; large deposits of excellent coal; vast forests of conifers suitable for lumber and for paper manufacture ($20,500,000 acres of such timber stands in the national forests alone); over 5,000,000 reindeer and a capacity for grazing 10,000,000 of these excellent beef producers; 475,000 horsepower in surveyed undeveloped water power sites; and very rosy prospects of huge grade oil production in several locations.

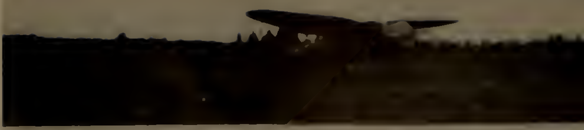
Thus 7 million has grown in 70 years under the careful management of the Federal Bureaus into a great treasure house of wealth on the land and in the sea.

Strategically Alaska has great possibilities. Fairbanks, in the great central plateau, claims to be the most strategically situated airport on the globe, in that she is nearer to all the great capitals of the Northern Hemisphere than is any other point. This claim is substantiated by the recent spectacular flights over the North Pole from Moscow to San Francisco by Soviet aces. It is a curious fact that, due to the management of the calendar and the crossing of the international date line, an enterprising flier can fly from Shanghai or Yokohama and arrive at Fairbanks at a little earlier hour on the same date.

From a naval standpoint some of the Alaska ports, such as Dutch Harbor, Unalaska Island, are of great importance.

Old timers in Alaska and many capitalists in the continental United States would very much like to see a less rigid control of the natural resources of Alaska. They feel that a more liberal exploitation of these re-

(Page 56 please)



Top to bottom, left: Ketchikan, Alaska; unloading plane at Cordova from steamer Yukon; Dana Fuller with assembled ship at Cordova. Right: Plane at Circle, Alaska; Fairbanks, Alaska, and its airport; Circle Hot Springs, Alaska; air view of glaciers between Seward and Anchorage, Alaska; plane at Telegraph Creek, Canada, and George Feldman, W. P. Fuller's Seattle manager, who accompanied Dana Fuller on this Alaskan argosy.

—Photo by Barboni.

Charles L. Wheeler
Executive Vice-President
McCormick Steamship Co.

Future of Our Merchant Marine

By Charles L. Wheeler

Executive Vice-President, McCormick Steamship Company

American shipping is a coordination of vessels, terminals and personnel engaged in the business of selling ocean transportation service.

The American merchant marine gives employment to approximately 200,000 individuals on its ships, on its terminals and in its offices, and indirectly to thousands more in shipyards, marine repair yards, manufacturing plants, ship chandlery establishments.

What this means to the American business man may be graphically illustrated from our own fleet of 31 vessels. To keep these vessels operating we paid out last year in round figures $1,000,000 for fuel oil, $2,500,000 for stevedoring, $1,000,000 for crews' wages and overtime, $500,000 for Panama Canal tolls, $500,000 for insurance, and large sums for sustenance and for repairs.

Recent figures issued by the Maritime Commission indicate the American seagoing merchant marine to consist of 1,144 ships with a total gross tonnage of 8,462,000. This feet is composed of: 235 Government owned ships, 196 of which were laid up and have largely been sold for scrap or conversion since this statement was issued; 487 ships in the coastwise or intercoastal services; 381 ships in foreign trade services; and 341 tankers.

These figures indicate that the total direct expenditures by the American merchant marine in maintaining its services would reach a tremendous sum.

Just prior to the World War American flag ships were carrying less than 10 per cent of the foreign commerce of the United States. During and immediately following the war period we built ships and increased our merchant fleet from 8,390,000 gross tons in 1915 to 18,460,000 gross tons in 1922, at a cost of over $3,000,000,000.

Today's problems in the American merchant marine date from that period. In 1920 and in 1928 and in 1936 we passed merchant marine acts designed to foster the growth of the American merchant marine to the point where we would be carrying at least 50 per cent of our foreign commerce in American flag ships operated by Americans citizens.

The result of the 1920 bill was a gradual transfer of the Government-owned war built merchant ships to private ownership.

The 1928 act amended the 1920 act in making more favorable construction loan provisions and more liberal mail contract provisions. Over 40 fine vessels were built under this act.

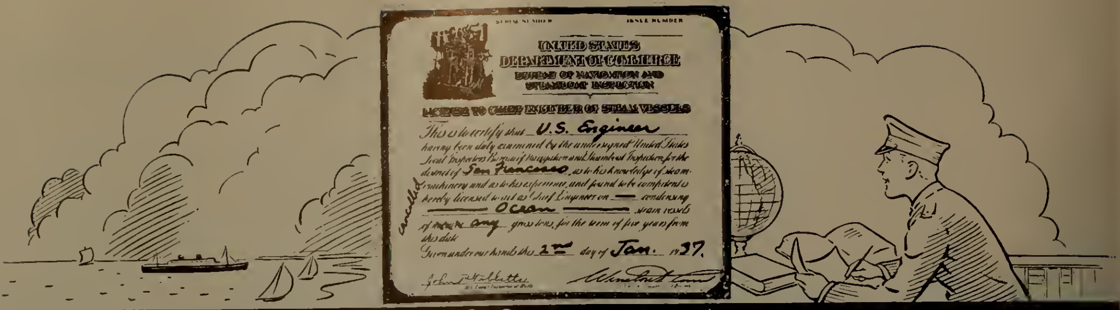
The 1936 act, under which we are now working, establishes a Maritime Commission of five men, who, under the provisions of this act, are to grant construction and operating subsidies, fix wages and working conditions, and put all American lines in the foreign trade on a basis of substantial parity in operating costs with their principal competitors.

Five good men are now working on this tremendous task. Under the chairmanship of Joseph P. Kennedy they are proceeding in a very businesslike manner with the progressive development of a permanent merchant marine policy. They have established temporary six months' subsidy contracts with the great majority of American operators in the Foreign Trade. During this period, ending January 1, 1938, the Commission and the contractors will endeavor to establish long term contracts on a permanent basis and involving a replacement construction program of considerable magnitude.

A very serious problem for the industry is that of securing new capital for investment in new ships and equipment under present conditions.

The declared policy of the Maritime Commission is "Subsidy only to operators who are properly financed and who are operating on essential trade routes." We can therefore expect that the permanent policy approved by the Commission will be one favorable to new capital investment and continued public support in the shipping industry.

Given substantial parity in operating costs and with a long range program of public support and of labor relations prevailing, the American merchant marine will become an established industry in which earnings on investment like those in stabilized industries ashore will be dependent on the qualities of intelligence, skill, industry and thrift to be found in the management of the various shipping lines.



Your Problems Answered by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

QUESTION

What is the simple unbalance problem?

ANSWER

The simple problem is often referred to as the static unbalance, because it is noticed by a tendency to turn or roll when the revolving part is placed on balancing rails. Also, for purposes of explanation, let us confine this problem to that of a revolving disk or wheel on a shaft, where the distance axially (in the direction of the shaft) is very small compared to the distance radially (normal or perpendicular to the shaft), that is, in a ratio of one to 10 or more. This eliminates largely (but not entirely) the dynamic couple, to be discussed later.

If a disk on a shaft is made mechanically symmetrical, shaped similarly in all directions radially from the center, it should be in balance, but will not be, probably, at high speeds, because of slight differences of density in the metal. For high speeds, above 900, all disks must be balanced.

The shaft carrying the disk or wheel is placed on two parallel rails, exactly level, smooth and hard. It will tend to roll, and finally oscillate back and forth, stopping with its heavy side down. Trial weights are put on the light side, top, and increased or decreased until the disk has no further tendency to roll when started slightly.

Asbestos putty or any other material easily added in small pieces makes a good trial weight.

The disk is now said to be in static balance. The word static is used to mean stationary balance, a balance like a weighing scale.

Then metal may be added to the light side by suitable bolting or clamping, or an equivalent amount of metal may be removed by drilling from the heavy side. It may also be chipped or filed off. The trial balancing weight is carefully weighed in ounces and fractions to help determine amount of metal to add or remove.

With electrical machines, weights are frequently added by adding solder to the armature binding wire. This should never be done on machines which run at over 1800 r.p.m., as the solder will probably be torn off by the centrifugal force acting upon it.

Attention is again called to the fact that the foregoing is only the simple problem, seldom encountered in practice. Actually, nearly all revolving masses, vibrating, are under the influence of two or more unbalance forces giving a dynamic or wobble vibration. This will be discussed in another article.

QUESTION

What is the effect of this simple unbalance?

ANSWER

The force set up in the disk by the unbalance is exactly the force that would be obtained if the correct balancing weight, correct in amount and distance from center of rotation, were to be revolved about the center all alone, or separate from the disk. Refer to the tabulation of forces set

TABLE GIVING THE CENTRIFUGAL FORCE IN POUNDS PRODUCED BY ONE OUNCE OF UNBALANCE FOR DIFFERENT SPEEDS AND DIAMETERS

	DIAMETER IN INCHES														
r.p.m.	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62
500	1.3	2.2	3.2	4.0	4.8	5.7	6.6	7.5	8.4	9.3	10.2	11.0	11.9	12.8	13.6
1000	5.3	8.8	12.3	15.9	19.4	23.0	26.5	30.0	33.6	37.1	40.6	44.2	47.7	51.2	54.8
1500	11.9	19.6	27.8	35.6	43.6	51.5	52.5	67.4	75.3	83.2	91.2	99	107	115	122
2000	21.2	35.4	49.5	63.5	77.6	91.8	106	120	134	148	163	175	191	205	219
2500	32.1	55.5	77.5	99.5	122	144	166	188	210	232	254	276	299	321	343
3000	47.7	79.6	111	143	175	207	238	270	302	334	366	398	430	461	493
3500	65.0	109	152	195	238	281	324	368	411	455	497	540	585	628	670
4000	85.0	142	198	255	311	368	425	481	538	595	652	708	765	821	878
4500	107	179	250	322	394	465	535	608	680	750	820	895	965	1038	1110
5000	133	221	309	398	485	575	663	750	840	930	1015	1105	1192	1280	1370
5500	162	270	378	486	595	702	810	920	1025	1132	1240	1350	1458	1565	1685
6000	191	318	445	572	700	826	955	1080	1210	1335	1465	1590	1720	1850	1975
6500	224	374	522	670	820	968	1120	1270	1415	1565	1715	1865	2010	2160	2310
7000	260	433	606	780	955	1125	1300	1470	1650	1820	1995	2165	2340	2510	2690

up by one ounce at different diameters and speeds. Note these forces can be very large for small weights. This will be a revolving force acting on the shaft at right angles to it and pulling the shaft in the direction of the weight. If the shaft is restrained by its bearings from moving in any direction at right angles to its center line, the force, of course, is transmitted to the bearings, causing them to be pulled first to one side then to the other, also up and down, in all directions with each revolution. Whether the bearing moves or not depends on the rigidity of its support. Unless the support is very large as compared to the size and weight of the disk it will surely vibrate or move some, perhaps only a few mils. If the vibration amount or amplitude is less than one mil, .001 inch, it may be considered satisfactory, and no further attempt made to balance it.

QUESTION

How can vibration amount or amplitude be measured?

ANSWER

Obviously it is impractical to measure this small change in dimension between the bearing and the wall or floor. It can be measured by several methods, all involving the use of a heavy mass and a spring.

If we were to securely fasten the case or frame of a Sterret Dial Indicator in a large hole in a piece of heavy metal, such as a large nut with $1\frac{1}{2}$-inch hole and weighing 2 or 3 pounds, then glue a pad of sponge rubber to one side of the weight, we would have a vibration indicator. The sensitive rod of the indicator extends through a hole in the rubber and is placed against the vibrating bearing. The rubber serves to steady the nut or weight so that the indicator rod vibrates, causing its needle to oscillate, the frame of the indicator being held steady by the weight. The amplitude of vibration is read as the distance between extremes of the swing of the needle.

QUESTION

How do machines, forced to run with unbalance, such as laundry extractors, sugar centrifugals or other centrifuges, operate and still run fairly smooth?

ANSWER

No machine would vibrate when unbalanced if its center of rotation were not restrained to the center of the shaft. A wooden top, spinning, is smooth running, yet unbalanced. The reason is that if we do not restrain the shaft, or force it with bearings to rotate on its center, it will naturally rotate about a different center, called the center of gravity. Perfect balance is best illustrated by a disk so adjusted that its center of gravity is the same as the center of its shaft. If we construct bearings which can move, to a limited extent perhaps, at right angles to the shaft, they will oscillate to allow the shaft to rotate about its center of gravity, or spin like a top. Thus, if we do not have close rotor clearances, and can allow it to oscillate in spinning, we would

Balancing

The forces set up in any revolving mass due to the centrifugal effect are all based on the fundamental relation, referred to in previous articles, and which is:

$$Fc = \frac{W \quad V^2}{32.2\ R} \text{ where}$$

Fc = centrifugal force in lbs.
W = weight of piece or part in lbs.
V = velocity of piece in feet per second.
R = radius of piece in feet or its distance from the center around which it rotates.

Each pound of metal in a revolving rotor has this force on it, and at high speeds these forces may become of great importance, both in the construction to withstand the forces and in the balancing of the rotor. To be in balance, all forces must be counteracted by opposite forces equal in value and directly opposite or opposed in position in rotor.

Expressing these dimensions in more practical units, we find that when:

Fc = centrifugal force in pounds
W = weight of piece in ounces
V = velocity in feet per second
R = radius in inches
D = diameter in inches
Then, if W = 1 ounce, and R P M = revolutions per minute.

$$Fc = \frac{12 \times 2 \times V^2}{16 \times 32.2 \times D}$$

$$V = \frac{R\ P\ M \times 3.1416 \times D}{60 \times 12}$$

$$V^2 = .000{,}019{,}1 \times D^2 \times R\ P\ M^2$$

and hence,

$$Fc = .000{,}000.884 \times D \times R\ P\ M^2$$

or expressed differently,

$$Fc = \frac{.884 \times D \times R\ P\ M^2}{1{,}000{,}000} \text{ pounds.}$$

Thus 30-inch Diameter at 3000 R P M

$$\text{gives } \frac{.884 \times 270{,}000{,}000}{1{,}000{,}000} = 238 \text{ pounds,}$$

which is the centrifugal force on a one ounce weight swinging around in a circle 30 inches in diameter at 3000 revolutions per minute.

In order to visualize this, just imagine your penknife, which probably weighs about one ounce, subjected to this speed and diameter of revolution. It would then be subject to a centrifugal force of 238 pounds, and unless made of the best materials would probably fly to pieces. The high speed revolving mass is certainly as highly stressed an object as is a high pressure boiler under full steam.

The tabulation gives several values of this force for different speeds and diameters.

not use rigid bearings, but give them some freedom of motion in a lateral direction. This we cannot do in turbines, motors and generators, gears, or other engine room machines, so we must give them a fine balance so that the center of rotation and center of gravity are one and the same point or line.

Laundry extractors and other centrifugals rotate in flexible bearings having limited lateral freedom, returned to normal position by springs.

QUESTION

What freedom of movement do we have in the rigid bearings of our marine engine room machines?

ANSWER

In a loose sense, we, of course, have no movement. But in an accurate consideration we find that all steel and iron structures have some movement if sufficient force is exerted to displace them.

A pedestal bearing, for instance, will have several mils lateral movement if several hundred pounds are applied to it in a horizontal direction. Furthermore, the base and foundation will spring up and down perhaps a mil or two if sufficient force is applied. We might not notice these movements if the force were steady and in one direction. But when these large forces not only oscillate back and forth and up and down, but also in all directions and at a frequency equal to the revolutions of the rotor, the movement becomes quite noticeable.

QUESTION

How can these movements be detected if no vibration indicator is at hand?

ANSWER

First, of course, by the sound made. Second, by the feeling imparted to the hand or foot. For very slight vibrations a simple device can be made to use the sense of hearing. A 3/8-inch round steel rod 4 feet long may be bent at right angles 6 inches from one end, making a sort of steel cane. Then by placing the short part against the forehead and the other end against any vibrating part, very slight vibrations can be felt or heard and the relative magnitude under different conditions may be judged. For even lesser noises or vibrations place the end of the short length against the side of the head at the upper end of the jaw bone and press it inward just in front of the ear. The slightest noises or vibrations can be heard. A light wooden rod or even a pencil may be used likewise.

A Question From the Field

The cylinders of my engine are lagged and covered with a black polished iron. This surface has been painted over with a white enamel paint. Which surface radiates the most heat into the engine room?—A. J. McM., New York.

ANSWER

Heat is dissipated from a surface by convection, that is, heating the air blowing across the surface, and by radiation, that is, heat is radiated from the surface just like light is radiated from an incandescent body.

A good reflecting surface is a poor radiating surface. A brightly polished coffee pot retains the heat a great deal better than a dull rough one. This can be demonstrated by noting the heat radiated to the back of your hand from surfaces at approximately the same temperatures but of different reflecting power.

Therefore, the black oxidized iron surface originally on your engine radiated considerably more heat into the engine room than after it was painted with a white enamel.

The approximate relative relationship of heat losses due to radiation, plus natural convection or heating the air, is as follows:

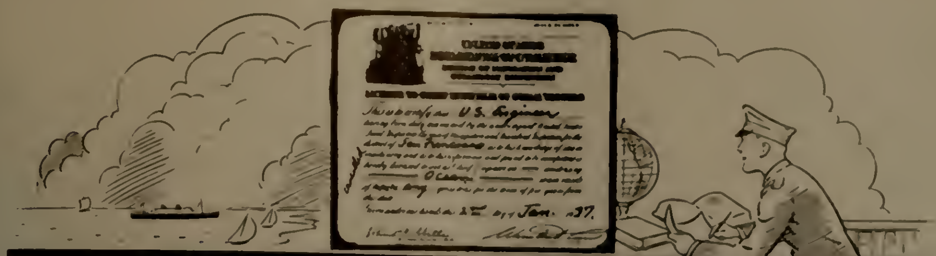
Dull black rough surfaces	100%
Black oxidized iron, rough	88%
Russian iron, polished black	72%
White enamel	40%
Aluminum paint	40%
Bright mirror	2%

There are other considerations which dictate the use of the black polished Russian iron for covers of heat insulation. It maintains its surface with rough usage, is easily polished and kept clean. Nevertheless, engine cylinders painted with aluminum paint, or white enamel, will keep a cooler engine room. The surface must be kept clean and bright, as collection of dirt or dulling of the surface increases the heat losses.

Radiated heat becomes heat in the engine room by being converted into sensible heat on the surfaces which it strikes, such as bulkheads, other equipment, and persons, so that it adds to the convected heat.

A Year's Free Subscription

To the first four operating engineers who send in identifications of this picture, which is a part of an engine room on a former Pacific Coast Steamer.



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

STARTING with the April issue we have taken out subscriptions to Pacific Marine Review in sufficient number so that copies are being sent to the Master, Chief Engineer and First Assistant of all our American flag vessels.

A letter from the publisher, Mr. J. S. Hines, has already advised that the magazine is being sent at the request of this company and in which your attention was called to the articles under the heading "Your Problems Answered by the Chief."

It was these articles which prompted the Management of the Standard Oil Company of New Jersey, Marine Department, to take out these subscriptions for you as it was felt that they would be of considerable assistance, particularly to the junior and unlicensed men in the Engine Department of your ship. As a result, the individuals to whom the magazines are sent are not to assume that the various issues are their own exclusive property, but rather that the copies are to be made available to any and all on board who might be interested.

The art of engineering, design and operation is advancing much more rapidly than any one individual can advance. All men in every branch of knowledge find it absolutely necessary continually to strive to keep abreast of the new things, the new ideas, in their respective lines of work. Coupled with this problem and still more important is the development of the young man, helping him in his first steps of an engineer's education. All of these things we are trying to do in the publication of the Bulletin, in our membership with the American Merchant Marine Library Association and numerous other ways

This page reproduced from the July-August 1937 issue of "The Ship's Bulletin," published by the Marine Department, Standard Oil Company of New Jersey.

Pacific Marine Review is deeply appreciative of this splendid cooperation and feels keenly the responsibility involved therein. We are now put "on the spot" to produce a department of real value to the seagoing personnel of the American Merchant Marine.

For the Deck Officers

A Department Devoted to the Problems of Licensed Masters and Mates Aboard Seagoing Vessels in the American Merchant Marine

We are sure that all of you licensed officers on board seagoing ships have realized for some time past a growing complexity in those affairs of the sea for which you are responsible. The vessels which you operate, the cargoes which you carry in those vessels, the passengers whom you transport, the body of laws and regulations that control you in your operations, have all been changing so rapidly in their demands on you that each of you would need a secretary and an attorney to keep you posted on the details and the consequences of these changes.

Like the professional man ashore, you will need to constantly study these changes in order to keep abreast of your profession. Unfortunately there are no bound volumes of printed literature that will be of much help to you in keeping abreast of marine progress. So rapidly are these changes going on that the books are obsolete almost before they are published. Your only source of up to date information is in bulletins issued by manufacturers, by maritime bureaus, and by the maritime commission; or in the best trade journals, which usually give you summaries of the contents of recent bulletins, informed comment thereon, and technical articles describing the most recent ships, analyzing the latest legislation, and detailing modern equipment.

Pacific Marine Review has been doing just that for the past 33 years, and doing it from the viewpoint of Pacific Coast shipping. Recently we have had demands from various sources that we should include in this journal departments especially directed to the problems of licensed officers aboard ship. We made a casual survey of the marine trade journal field and found that several of our contemporaries were publishing such departments. These departments, however, were largely directed toward assisting the young man coming up for examination for license. They are of great value to such young men and to many of the older licenser personnel, but their scope is limited largely to the direct duties of these officers in connection with navigation or with the operation of propulsion plants. It was obvious, therefore, that departments of this type were not the answer to the demands we were getting from licensed officers. Something that went a little deeper and that gave the officer a basis for constructive thought on the fundamentals of the modern shipping business and the operation of modern ships was the need and the demand from the modern American ship's officer.

We realized, of course, that this is a very large order, and we began to "crawl" around a bit and to feel out the demand. We soon realized that the demand was great enough to warrant at least a sincere effort to supply the need. So some months back we began publishing such a department for engineer officers under the caption "Your Problems Answered," by "The Chief." This department has had a very gratifying reception.

In the meantime we have been studying the problems of the deck officer. These are far more complex and far less concrete than those of the ship's engineer. Indeed, it very often happens that when some problems of the engine room become over-complex they are forthwith dumped into the "lap of the bridge."

It might be said — with as much truth as attaches to any general statement—that the problems of the deck officer on board an American ship today include all the problems of life.

The master of a vessel, and his mates, must exercise all the powers and execute all the functions that pertain to all the officials of a city, and in addition they are the general manager and the superintendents of a large transport unit and legally and ethically responsible for the welfare and safety of the cargo and passengers and crew on that unit.

If the mayor of a city has responsibilities and problems which are too much for him, then he can consult with his supervisors and attorneys and political advisers and, if needs be, resign without and get rid of his problems without injuring anyone.

In a similar situation, the captain of a vessel has no resource other than his own ability and that of his mates. True, he can wireless for advice, but in him alone rests the decision and the responsibility.

Knowing this condition, we are now, with considerable hesitancy, starting a department in which we shall try to cover some phases of the problems met by deck officers on seagoing ships and to offer some suggestions for better methods of solving these problems.

Many topics have been suggested to us for inclusion in this department. Among them are:

- The New Marine Legislation
- Examinations for License
- Legal Status of Licensed Officers
- Marine Engineering for Deck Officers
- Naval Architecture for Deck Officers
- Human Relations Aboard Ship
- Bridge and Engine Room Cooperation

Hazards and Emergencies
Crew Drills
Marine Insurance for Deck Officers
Rigging
Cargo Handling
Cargo Stowage
Sanitation
The Medicine Chest
Feeding the Crew
Ship's Business in Port.

These topics are not listed in the order of importance or publication but are merely suggestive of the scope that may be covered in this department.

It must be obvious that no part of such an ambitious program can be treated fully and in detail within the space limits available. Our aim will be to sketch briefly the direction and trend of thought on each topic, and to refer you, wherever possible, to authoritative articles in the Pacific Marine Review and other books. In order that this department shall be of real help it is almost imperative that we get reactions from you deck officers. May we assure you that your constructive critical comments or suggestions will be very welcome and will be used for the betterment of the department?

Editorial Note: One of the better known port captains in charge of the operations of a Pacific Coast fleet of steamers operating out of San Francisco has generously consented to prepare for this department material covering today's problems for Deck Officers in the American Pacific Ocean merchant marine.

Next month's installment will cover some historical background for these problems.

Deck Officers will please feel free at any time to send in questions, corrections, or suggestions concerning this column. Address:

Editor, Pacific Marine Review,
500 Sansome Street,
San Francisco, California.

Merchant Marine Deck Officers' Licenses

The following list shows the licenses granted during the month of July to engineer officers of the merchant marine at Pacific Coast offices of the Bureau of Marine Inspection and Navigation. For key to abbreviations see footnote.

Name and Grade	Class	Condition
SEATTLE		
Charles Savlsky, Master & Pilot	OSS, any GT	RG
Julius A. Zinn, 3d, 3d Mate	OSS, any GT	O
Howard L. Codling, 3d Mate	OSS, any GT	O
SAN FRANCISCO		
Robert Ward Prince, Master	OSS, any GT	RG
Anthony M. Balkunas, Jr., Chief Mate	OSS, any GT	RG
John M. Fitzsimmons, Chief Mate	OSS, any GT	RG
William H. F. Haars, Chief Mate	OSS, any GT	RG
Paul F. Meyer, Chief Mate	OSS, any GT	RG
Robert L. Downer, Chief Mate & Pilot	OSS, any GT	RG
Henry G. O. Hooper, 2nd Mate	OSS, any GT	O
Lloyd W. Sheldon, 2nd Mate	OSS, any GT	RG
Charles G. Strom, 2nd Mate	OSS, any GT	RG
Milton H. Barber, 2nd Mate	OSS, any GT	RG
Robert L. Dahllof, 2nd Mate & Pilot	OSS, any GT	RG
Josva O. Hatlen, 2nd Mate & Pilot	OSS, any GT	RG
Barwell H. Chappell, 3d Mate	OSS, any GT	O
Malcolm A. Gompertz, 3d Mate	OSS, any GT	O
Walter J. O'Hara, 3d Mate	OSS, any GT	O
George D. Washburn, 3d Mate	OSS, any GT	O

Merchant Marine Engineer Officers' Licenses

Name and Grade	Class	Condition
SEATTLE		
Boyd H. Christian, Chief Eng.	OSS, any GT	O
Merl A. Johnston, 1st Ass't Eng.	OSS, any GT	RG
Carl A. Peterson, 2nd Ass't Eng.	OSS, any GT	RG
Norman W. Koch, 2nd Ass't Eng.	OSS, any GT	RG
PORTLAND		
Harold S. Barton, Chief Eng.	OMS, 300 GT	
1st Ass't Eng.	OMS, 450 GT	
3d Ass't Eng.	OMS, any GT	O
Fred T. Rosebraugh, Chief Eng.	OMS, 300 GT	O
Thomas L. Smith, Chief Eng.	OMS, 300 GT	
2nd Ass't Eng.	OMS, any GT	O
Chester W. Harms, 3d Ass't Eng.	OSS, any GT	O
JUNEAU		
George M. Rutherford, 1st Ass't Eng.	OMS, any GT	RG
Thomas S. Simpson, 2nd Ass't Eng.	OSS, any GT	RG
SAN FRANCISCO		
Harold D. Thompson, Chief Eng.	OSS, any GT	O
George A. Rowell, Chief Eng.	OSS, any GT	RG
Roger J. Wood, Chief Eng.	OSS, any GT	RG
James W. Ayers, 1st Ass't Eng.	OSS, any GT	RG
George Moran, 1st Ass't Eng.	OSS, any GT	RG
Per Oscar Nordin, 1st Ass't Eng.	OSS, any GT	RG
Gerald Taylor, 1st Ass't Eng.	OSS, any GT	RG
Lester A. Van Etten, 1st Ass't Eng.	OSS, any GT	RG
Bernard R. White, 1st Ass't Eng.	OSS, any GT	RG
Joseph J. Smith, 2nd Ass't Eng.	OSS, any GT	O
Joseph W. Betts, 3d Ass't Eng.	OSS, any GT	O
Max E. Cann, 3d Ass't Eng.	OSS, any GT	O
Fay Francis Glover, 3rd Ass't Eng.	OSS, any GT	O
John A. Halvig, 3d Ass't Eng.	OSS, any GT	O
Roy J. Osborne, Chief Eng.	OMS, any GT	O
David Raggio, Chief Eng.	OMS, any GT	O
Louis J. Raggio, Chief Eng.	OMS, any GT	RG
Charles C. Tillman, 3d Ass't Eng.	OMS, any GT	O

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Some Comments on . . .

Shipping Legislation

A Review of Bills Proposed, Pending and Passed at Washington

A very interesting pair of pending bills, directed at one of the maritime problems confronting the American shipowner, is the combination of S. 2900 and H. R. 8080. These two have the common purpose "To establish a fund for the insurance of mortgages securing loans for the construction or reconditioning of domestic floating property used for commercial purposes."

Commenting on these bills and the reasons for their introduction in the House and Senate, a very prominent marine authority and a proponent of this legislation presents the following:

For years it has been most difficult to stimulate any interest in financing the construction of domestic floating property on the part of private banking and financial institutions. This apathy is partly due to the fact that very little of such financing has been done and partly due to the lack of any proper instrumentality to intelligently study the various phases of the projects under consideration. Lacking both experience and knowledge, how could underwriting be reasonably assured of the soundness of the economics involved in such projects?

Under this Government insurance it is believed that loans against mortgages on certain classes of domestic floating property will be as safe and as desirable investments as are offered in equipment trust securities, and it is further the opinion of many that interest can be aroused in this class of investment, so that within a comparatively short time, private investing capital will seek such investments and that mortgages on floating property, in the form of equipment trust certificates, will be found acceptable under the laws of many States for the investment of funds of life insurance associations and trust funds.

The Government has spent large sums of money in developing canals, inland waterways, and improving the channels of our rivers, but the use of these waterways has not kept pace with their development, private capital being unfamiliar with the problems and hesitant to embark in this field.

It is assured that by the simple expedient of Governmental insurance of mortgages on domestic floating property, private funds will be immediately available for the rehabilitation and replacement of existing equipment and building of additional facilities. This will result in a comprehensive program of vessel construction and operation in those States that touch our Lakes, Bays, Sounds, Rivers, and Canals.

Such a program would be greatly in the public interest for the following reasons:

1. In the interest of safety, most of the vessels in these services are lacking in proper subdivision, stability in damaged condition, and are of the most inflammable type of construction. The replacing of these vessels by modern fireproof ships would make passenger transportation infinitely more safe than at present.

2. If this equipment were modernized by the building of efficient units, particularly designed for specific services, the industry as a whole would be placed on a better basis and undoubtedly our inland waterways would be more fully utilized.

3. The resulting building and reconstruction program would widely distribute the moneys involved over many sections of the United States and would assist many small communities and small shipyards in furnishing employment.

4. The replacement of our excursion steamers with properly constructed fireproof vessels would remove one of the greatest concentrated hazards that we have on our inland waterways.

5. Use of our inland waterways would be greatly extended. Reduction in freight and passenger rates would be accomplished and employment widely spread.

6. It is recognized that mechanics versed in the art of shipbuilding are not numerous. Increased work in the

The financing of river towboats, barges, and inland water passenger vessels would be made easier by the mortgage insurance bills now pending at Washington.

smaller shipyards throughout the United States would result in the training of a large number of mechanics, available not only for the construction of these smaller craft, but also well fitted to be employed in yards undertaking the larger shipbuilding program.

The text of S. 2900, as introduced by Senator Radcliff on July 22 and referred to the Committee of Commerce, is as follows:

75th CONGRESS
1st Session
H.R. 8080
and
S. 2900

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That as used in this Act—

Sec. 1 (a) The term "mortgage" means a first mortgage to secure loans or advances made to aid in financing the construction or reconditioning of domestically owned floating property used for commercial purposes on the intercoastal waters of the United States, on the Great Lakes, or on bays, sounds, rivers, harbors, or inland lakes of the United States;

(b) The term "floating property" includes, but shall not be limited to, ocean-going vessels, bay steamers, excursion steamers, ferries, dredges, tugs, towboats, barges, and fishing vessels;

(c) The term "mortgagee" includes the original lender under a mortgage, and his successors and assigns approved by the Commission; and

(d) The term "mortgagor" includes the original borrower under a mortgage and his successors and assigns.

Sec. 2. There is hereby created a mutual mortgage insurance fund (hereinafter referred to as the "fund"), which shall be used by the United States Maritime Commission (hereinafter referred to as the "Commission") as a revolving fund for the purpose of carrying out the provisions of this Act. Moneys in the fund not needed for the current operations of the Commission shall be deposited in the Treasury of the United States to the credit of the fund, or invested in bonds or other obligations of the United States. The Treasurer of the United States is hereby directed to pay interest semiannually on any amount so deposited at a rate not greater than the prevailing rate on long term Government bonds, such rate to be computed on the average amount of such bonds outstanding during any such semiannual period. The Commission may, with the approval of the Secretary of the Treasury, purchase, at not to exceed par, in the open market, debentures issued under the provisions of section 4. Debentures so purchased shall be canceled and not reissued, and the several group accounts to which such debentures have been charged shall be charged with the amounts used in making such purchases.

The construction of new and the reconditioning of existing tugs, ferries, fishing craft and other types will be encouraged by the passage of H. R. 8080 and S. 2900.

Sec. 3. (a) The Commission is authorized, upon application by the mortgagee, to insure as hereinafter provided any mortgage offered to it within six months from the date of its execution which is eligible for insurance as hereinafter provided, and, upon such terms as the Commission may prescribe, to make commitments for the insuring of such mortgages prior to the date of their execution or disbursement thereon. The aggregate principal obligation of all mortgages insured under this Act shall not exceed $100,000,000.

(b) To be eligible for insurance under this Act a mortgage shall—

(1) have a mortgagee and a mortgagor approved by the Commission as responsible and able to service the mortgage properly;

(2) involve an obligation in a principal amount which does not exceed 75 per centum of the cost of the construction or reconditioning financed by the loan or advance or not to exceed 75 per centum of the appraised value of the property mortgaged to secure such loan or advance;

(3) have a maturity satisfactory to the Commission but not to exceed twenty years;

(4) contain complete amortization provisions satisfactory to the Commission requiring periodic payments by the mortgagor;

(5) bear interest (exclusive of premium charges for insurance) at a rate not to exceed 5 per centum per annum on the amount of the principal obligation outstanding at any time;

(6) provide, in a manner satisfactory to the Commission, for the application of the periodic payments to amortization of the principal of the mortgage; and

(7) contain such terms and provisions with respect to the construction or reconditioning and maintenance of the property, repairs, alterations, payment of taxes, delinquency charges, revisions, foreclosure proceedings, anticipation of maturity, additional and secondary liens, and other matters pertinent to the security as the Commission may prescribe.

(c) In passing on applications for insurance the Commission shall have due regard to the public convenience and necessity of the construction or reconditioning project proposed to be financed.

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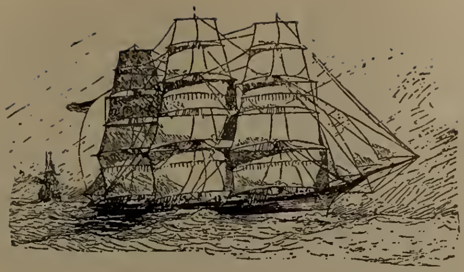


Pacific Ocean Shipping and

A Survey of the Month's Development

Wings Over the Pacific. It seems almost incredible that during the month of July the Pan American Airways transpacific clippers completed the 125th regular commercial scheduled flight across the Pacific Ocean and the first million miles of commercial flight over that big water. This record was completed with the landing of the Philippine Clipper at Cavete Base, Manila, on July 12. Check of the logs of the clippers showed the total distance sailed on their regularly scheduled flights to be 1,012,784.8 miles. This mileage was covered in 7,659 hours and 46 minutes in the air, all without accident or mishap.

These great silver winged air transports are flashing regularly across those seas which a few short years back were the last haunts of the sailing clippers, of Malay and Chinese pirates, and of the South Sea trading schooner.

The study of these waters from the air is revealing some very interesting possibilities. For instance, take Pratas Reef, 200 miles southeast of Hongkong in the China Sea and almost vertically below the direct air line from Manila to Hongkong. Many good ships of sail in the first half of the 19th Century found an inhospitable graveyard on these desolate rocks, and many a good sailor perished there. Many years ago the Chinese Government established a light and a meteorological observatory there to give advance reports on typhoons and to warn shipping. Some fifty Chinese are located on this reef to serve as light keepers and observers. These men are isolated for six month periods. Newspapers and mail for them are frequently dropped by the clippers.

The officers of the clippers have been studying this reef from the air, and now report that conditions warrant a surface investigation, in the hope of making the protected inner waters surrounded by this reef a practical and safe emergency landing for aircraft. Thus will a place of peril become a haven of refuge.

Then there is the ancient Portuguese colony of Macao, on an island of the same name at the west side of the mouth of the Canton River opposite Hongkong. This island ha now become the Asiatic port of entr for the aerial clippers. Here, on Gui Hill, is the lighthouse built in 186 and modernized in 1912, whicl blinks the light signals at the weekl arrival of the Pan American Airways Hongkong Clipper. On this hil near the lighthouse are the ruins o a fort and a cathedral built in 1626 The Portuguese traders first mad

A Monthly Review of Tanker Markets

By Oscar J. Beyfuss

There were strange contrasts in the markets reviewed, but an underlying strength is noted.

Time Charters

The strength of the markets is indicated by this department. Several diesel motorships were again taken at 8/3 for three years. A small tanker gets 7/6 for three years beginning September, 1937. A steamer was fixed at 5/3 for three years from February/April, 1938.

Voyage Charters

AMERICAN - GULF TO NORTH OF HATTERAS—Today this market is lifeless. Since last month's review clean rates went from 55c to 37c, while dirty tonnage dropped to 40c.

Intercoastal

No fixtures reported. Clean fixtures.

FOREIGN GULF TO UK-CONTINENT—Started upward to 34/- anc dropped to 28/-. No late charters from U. S. Gulf but Aruba and Venezuela were done at 24/- to 27/-. Dirty tonnage from Aruba and Venezuela gets 23/- and 20/-.

California to UK-Continent: Nothing new. Clean.

Black Sea to UK-Continent: Charters ranged around 22/6 and 23/- while no dirty fixtures are recorded.

Black Sea-Far East: Nothing reported.

California-Australia-New Zealand: No charters were disclosed.

California to Far East: Dirty fixtures dropped to 26/- and 27/- but several were then done at 30/-. Clean charters were made at 38/- and 40/- basis North China.

July/August, 1937	1936	1935	1930
Gulf N.H. clean 55c to 60c	17c	Lifeless	Abt. 70c
Gulf N.H. dirty 55c to 60c	15c	Lifeless	Abt. 70c
Calif./U.K.-Cont. 43/3	21/9	16/1	30/-
Calif./Japan, 30/-	12/9	10/6	20/-
Time Charters basis 1 year, Motorships, abt. 8/-	6/1	Abt. 5/-	9/1

Comparison of tanker charter rates for July-August from 1930-37.

Pacific Coast Port Notes

in the Pacific Maritime Industry

commercial contact with the haughty Chinese mandarins and established a trading post at Macao in 1557. Their cathedral was destroyed shortly after it was built, but the front facade, with its surmounting cross, stood for over two centuries. Sir John Bowring, one of the first British statesmen to open negotiations with the Imperial Chinese Government, on his first trip out, as his ship was tacking up the China Sea, caught a vision of this cross against the setting sun and was inspired to write what has become one of the best known poems in the English language, beginning:

In the cross of Christ I glory,
Towering o'er the wrecks of time.

Bowring called Macao the "Gem of the Orient Earth." It seems to have had a special charm for poets. Almost at the beginning of its history as a colony that greatest of Portuguese poets, Camoens, was banished to this out of the world spot and was there inspired to write his great epic, the "Lusiad." So the most modern of air transport development ties in with the most ancient of European developments in the Orient.

To old China these four centuries seem but a passing phase of timeless existence. To young China they are a welcome aid in shaking off the shackles of tradition. To the Pan American Airway officials they are a foundation on which to buil'd a framework of commercial success in giving rapid, dependable communication and transport between the New Great West and the Ancient Great East.

All of these facts and fancies are set down after reading a recent issue of the weekly News Bulletin issued by the Pan American Airways. This bulletin also announces that typical tariffs among the new international air express rates from Alameda Airport to points in China are: to Canton, Swatow, Amoy, $4.68; to Foochow, $4.72; to Wenchow, $4.81; to Shanghai, $4.91; to Nanking, $4.99; to Tientsin, $5.17 (per pound).

These rates are of great interest as indicating the nature of the cargo that may be carried. Certainly no California fruit grower is going to get excited about air express. These rates are for articles of high value and small bulk—precious stones, valuable antiques, medicines that must be rushed to save life.

No matter how dependable and speedy the air crossing is, surface ships will still be needed for economy in cargo and passenger transport. Airship service is not a competitive service, but rather a complementary service to that given by surface vessels. Men and things that must rush go in airships. Men and things that must travel economically go in surface ships. There will always be far more men and things in the latter category.

Friday the 13th—A Headache

On at least one former occasion we called the attention of the U. S. Maritime Committee to the inadvisability of issuing important long range orders on a Friday. Our admonition apparently has gone unheeded. The bold boys of the Commission are now indeed courting disaster. They have just issued the most unpopular order of the year not only on Friday, but on Friday the 13th. And mark you well, not content with such a flouting of "Lady Luck," they had to make this order in reference to Paragraph 13 of a certain agreement.

No wonder this order is causing many headaches among ship executives. To begin at the end:

The Operating-Differential Subsidy Agreements, granted to all the American shipowners now operating under subsidy in the foreign maritime trade of the United States, bind the Maritime Commission as an agent of the United States for only the last six months of the present calendar year.

Paragraph 13 of these agreements binds the shipowner (applicant for subsidy) to a very significant obligation but does not bind the Commission in any way. It reads:

"**Long Range Program.** The Applicant agrees that, during the period of this agreement promptly and with due diligence and in a manner satisfactory to the Commission, it will endeavor to

"(a) Formulate and develop a long-range program (including necessary financing) satisfactory to the Commission for the replacement of all vessels over fifteen years of age;

"(b) Devise plans satisfactory to the Commission and the Navy Department for the first of the new vessels required to be constructed by the long range program;

"(c) Take such further action as the Commission may require in order to enable the Commission to advertise for competitive bids for the construction of such vessels.

"The Applicant agrees to make such reports and to furnish such information with respect to the foregoing matters as may be required by the Commission from time to time."

Now any applicant would naturally conclude that he was agreeing to send this required information to the Commission on or before January 1, 1938. But suddenly out of the Commission offices in Washington comes an order reading:

"Pursuant to the Merchant Marine Act of 1936 and Paragraph 13 of the Operating - Differential Subsidy Agreements, all contractors are required to furnish full and detailed reports to the Commission, on or before September 1, 1937, setting forth their proposed long-range programs for the replacement of all vessels now over 15 years of age. The reports should include full information concerning the number, size, and type of the vessels to be constructed, the proposed arrangements for financing the new construction, and any other information deemed pertinent by the operators."

And this "shipowners' headache" is dated August 13, and August 13 is a Friday!

Again we ask, is there any reason why Mr. Peet, the honorable Secretary of the Maritime Commission, could not have dated this paper the 12th or the 14th and spared the feelings of some of the old sailors among our shipping executives?

American Legion in the Merchant Marine

Full Speed Ahead! will be the watchword of Merchant Marine Post No. 420, 17th District, Los Angeles, of the American Legion, in announcing the newly elected officers for the ensuing year: C. S. Booth, Matson Navigation Co., commander; S. T. Olafson, Commerce & Shipping Dept. Chamber of Commerce, first vice commander; Ike Morgan, McCormick Steamship Co., 2nd vice-commander; H. W. Woodruff, Quaker Line, adjutant; W. J. Sweeney, Inter-Ocean Line, finance officer; J. W. Hadley

Pacific Coast Customs Districts

District No.	Name of District	Boundary of District	Ports of Entry
31	Alaska	All of the territory of Alaska.	*JUNEAU, Cordova, Craig, *Eagle, *Hyder, *Ketchikan, Nome, *Petersburg, *Seward, *Sitka, *Skagway, Unalaska, *Wrangell.
32	Hawaii	All of the Territory of Hawaii.	*HONOLULU, Hilo, Kahului, Mahukona, Port Allen.
27	Los Angeles	All of that part of the State of California lying south of the northern boundaries of the counties of San Luis Obispo, Kern, and San Bernardino, except the counties of San Diego and Imperial.	*LOS ANGELES, Port San Luis.
29	Oregon	All of the State of Oregon and that part of the State of Washington which embraces the waters of the Columbia River and the north bank of the said river west of 119° of west longitude.	*PORTLAND, OREG., *Astoria, Longview, Wash., *Marshfield, Newport.
25	San Diego	All of the counties of San Diego and Imperial in the State of California.	*SAN DIEGO, Andrade, Calexico, San Ysidro, Tacate.
28	San Francisco	All of that part of the State of California lying north of the northern boundaries of the counties of San Luis Obispo, Kern and San Bernardino.	*SAN FRANCISCO - OAKLAND (Collector of Customs located at San Francisco, Calif.), *Eureka.
30	Washington	All of the State of Washington except that part which embraces the waters of the Columbia River and the north bank of the said river west of 119° of west longitude.	*SEATTLE, *Aberdeen, Anacortes, *Bellingham, Blaine, Danville, Everett, Ferry, Friday Harbor, Laurier, Lynden, Metaline Falls, Molson, Nighthawk, Northport, Olympia, Oroville, *Port Arthur, *Port Townsend, South Bend, Spokane, Sumas, *Tacoma.

Ports first named in caps are headquarters in their districts. (*) indicates ports at which marine documents are issued.

American-Hawaiian Steamship Co., historian; B. F. Bolling, sergeant at arms; Wm. Ball, chaplain; Paul Chandler, P. N. Carter and A. J. Norton, executive committee; and R. O Vernon, Dollar Line, retiring commander, junior past commander.

This Post, composed of World War veterans engaged in the steamship business and allied industries, is the first of this name and restricted membership in the Legion; however, plans are under way for organization of similar Posts at San Francisco, New York and other seaport cities.

A review of the past year's activities discloses that, despite the Pacific Coast maritime strike, the Post exceeded its membership quota, held 22 meetings, took an active part in the successful legislative program of the Legion to exempt shipbuilding material from the California sales tax, and the Speakers' Bureau made 64 talks before other Posts and service clubs in Southern California on maritime subjects.

A letter of congratulation has been received from Jos. P. Kennedy, chairman of the U. S. Maritime Commission, commending the Post on its program of familiarizing the public with the need for a new and adequate merchant marine.

The Speakers' Bureau will be continued and open dates are available for various organizations after September 1.

Pacific Coast Ports

The major event affecting Pacific Ocean shipping during the month of August is, of course, the physical argument between China and Japan. Passenger and cargo shipments from Pacific Coast ports to the Orient have fallen off sharply since the fighting at Shanghai started, and some authorities place the reduction in these shipments at nearly 50 per cent. Practically every port on the Pacific Coast is or will be affected by this disturbance.

These reductions will be only for a short period. If the disturbance is quieted promptly, then normal trade will be resumed almost immediately. If the disturbance grows into a major war, undoubtedly it will bring about a realignment of trade routes and possibly a boom in shipping at much more profitable rates than those now in force.

Pacific Steamship Lines Ltd. has submitted to the court a proposal for reorganization, whereby the assets of the firm will be transferred to a new corporation formed by the creditors' committee, in the apparently well founded hope that by limited operation and orderly liquidation all the creditors may eventually be paid in full. A revival of the services of this pioneer line would certainly be of interest to every Pacific Coast port.

With a few minor exceptions the maritime labor unions of the Pacific Coast have tacitly agreed to continue the present status of relations with their employers, and strong hope is expressed that industrial peace will prevail on our waterfronts.

● San Francisco Bay

At the Port of Oakland two new port commissioners, **Frank Colbourn** and **Eugene W. Roland**, have been appointed in place of Commissioners **Robert A. Leet** and **Leroy H. Goodrich**. Leet and Goodrich are retiring after 10 and 6 years respectively of useful service on the Board. In addition to the two above named, the Board now consists of:

James J. McElroy, president
Ralph T. Fisher, 1st vice president.
Dr. George C. Pardee.

Frank Colbourne has been appointed 2nd vice president.

Port of Oakland is the site of the most important Coast Guard base on the Pacific Coast.

An interesting shipment of heavy cast iron pipe was recently brought out to Oakland from Birmingham, Alabama, by several Luckenbach cargo liners. This pipe is 6 feet in diameter and weighs 9 tons to the length. 650 tons of it will be used in conveying Oakland estuary water at the rate of 160,000 gallons a minute to the condensers in the new $5,000,000 standby electric generating plant now being erected at 1st and Grove Streets, Oakland, by the Pacific Gas & Electric Co.

Early in August A. H. Abel, port manager, was authorized to lay a 36-inch pipe line under the railway yards that are now being prepared for San Francisco-Oakland Bay Bridge lines. This pipe will be used to convey dredged material from the present Outer Harbor basin to the future North Harbor area.

The Cunard-White Star Line report that their transatlantic passenger business in San Francisco increased 67 per cent over the same period for 1936.

During July 445 ships, with an aggregate net measurement of 1,473,797 tons, arrived through the Golden Gate with cargo for the various ports on San Francisco Bay.

● Puget Sound

Tacoma reports her June business in water borne exports aggregated 11,765 tons, valued at $6,237,048.

The Port of Seattle has engaged the services of C. C. Kirkpatrick of Washington, D. C., as a foreign trade expert to make a survey of the possibilities of increasing the foreign trade of the port by the establishment of a foreign trade zone there.

(Page 56 please)

Conversion from . . . .

Cargo Carrier to Tanker

Craig Shipbuilding Company Transforms M.S. Mazatlan, Coastwise Cargo Carrier, to M.S. San Diego, Coastwise Tanker

The transformation of the coastwise cargo carrier M.S. Mazatlan into the coastwise gasoline and diesel oil tanker M.S. San Diego, as made at the yards of the Craig Shipbuilding Company at Long Beach, California, presents some rather novel and interesting features.

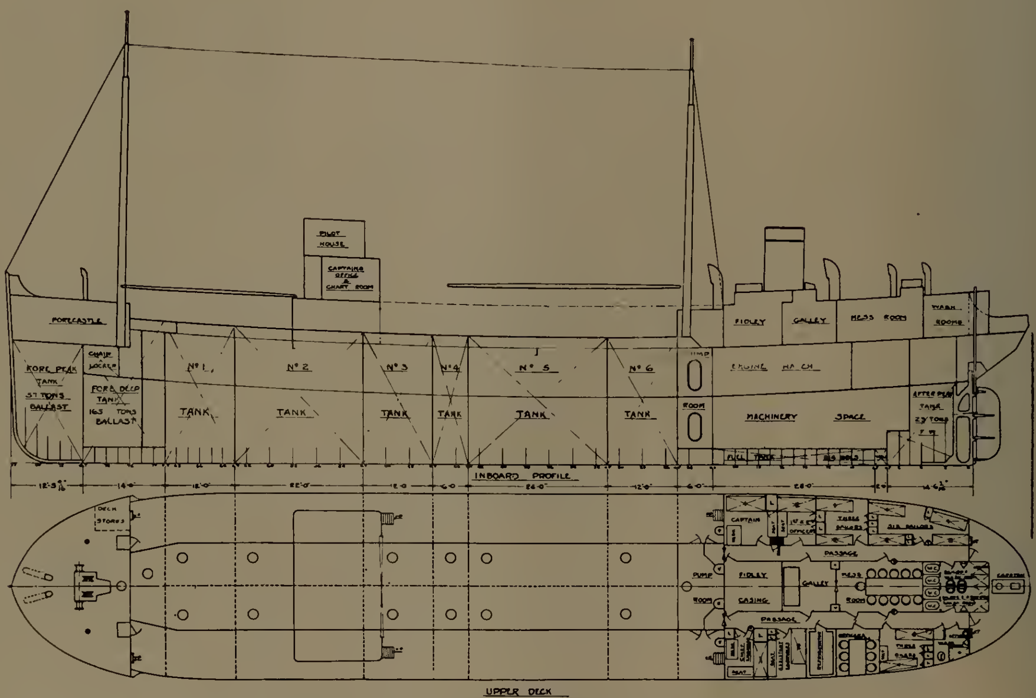
This vessel was built at the Long Beach yard as a diesel driven single end type cargo and passenger carrier for the Mexican Pacific Coastwise trade, and operated in that trade until Mexico passed laws practically prohibiting American vessels from competing in her coastwise trades. She was then laid up until quite recently, when the Star and Crescent Boat Company of San Diego purchased her and commissioned the Craig Shipbuilding Company to convert her into a tanker, specifying that the resultant product should be classed A-1 for coastwise tankers by the American Bureau of Shipping, and that Pillsbury & Curtis of San Francisco represent the owners as supervising naval architects.

The new tanker will bear the name San Diego, and will be used to transport various brands and grades of gasoline and of diesel oil from San Pedro to San Diego and to other coastal points in Southern California. This service necessitated numerous small tanks, and as finally worked out the vessel will carry 10,000 barrels of gasoline and diesel oil in six double tank spaces, making 12 cargo carrying tanks of various capacities.

Principal characteristics of the M. S. Mazatlan as built were:

Length B. P.	164.3 feet
Beam	34.1 feet
Depth	17.8 feet
Gross measurement	987 tons
Net measurement	589 tons

Her power plant consists of two 350 brake horsepower six cylinder Winton directly reversible diesel engines. Each of these engines is direct connected through a tail shaft and a Kingsbury thrust bearing to a Lambie manganese bronze propeller.



Inboard profile and deck plan of coastwise tanker M.S. San Diego.

This is the original power plant, but several years back the engines were completely overhauled and modernized by the Winton Diesel Engine Company.

In order to prepare the hull for the tanks all the 'tween decks and the bulkheads in way of tank spaces were cut away, leaving the beams and girders intact for stiffening. New oil tight bulkheads for the tanks were then fabricated by welding and welded into the ship's hull. Since the rivet joints on the laps of the shell plating were not up to the requirements for oil tight spacing, every lap joint in the shell in way of the cargo tanks was head welded continuously along its outer edge, making an absolutely oil tight seam. Thus, so far as oil tightness is concerned, this tanker is completely electric arc welded in way of her tanks. Lincoln Electric Company supplied the welding rod.

A pump room was installed just forward of the engine room. In this pump room four cargo pumps are located with drive through stuffing boxes, in the engine room forward bulkhead. Two of these pumps are Fairbanks-Morse contrifugals each driven by a 100 H.P. Cummins Diesel engine located in the engine room. These pumps each have a capacity for discharging 500 gallons of gasoline a minute. The other two pumps are Kinney rotary type driven by electric motors located in the engine room. One of these rotary pumps is used exclusively for diesel fuel with an entirely independent system of suction and discharge lines to avoid contaminating the gasoline or the diesel fuel. The other rotary is used as a stripping pump on the gasoline lines to empty the tanks of any residue that the centrifugals cannot pick up.

The cargo discharge and load piping system is carefully laid out so that there is practically no possibility of leakage between tanks or of mixing the contents of tanks in discharging or loading. Crane pipe fittings and pipe are used throughout. Walworth valves control the pipe system.

Each cargo tank is equipped with two gate valves located on the after or suction side of the tank, so there is a double valve shut-off between tanks. A one-half inch sounding pipe is run from the deck to the discharge line between the two shut off valves so that by applying air pressure it is possible to check any leak in the valves separating the gasoline in the different tanks by gaging the change in pressure.

Upper: The Mazatlan as a coastwise cargo and passenger carrier.
Lower: Same ship partly converted to a coastwise tanker. Taken at Craig's yard just before dry docking.

Small portable air blowers will be carried aboard. Arrangements are made so that these can be hooked up with their discharges blowing into the bottom of the tanks. Thus the tanks will be freed of gas fumes by air blowing rather than the common practise of using salt water or steam. The Star and Crescent Boat Company have had very good success with this method of tank cleaning in their barges, and find it to be not only more economical but quicker and very satisfactory.

As will be noted from the outboard profile and deck plans herewith, the M.S. San Diego will have very much the same appearance and arrangement as the standard type of large seagoing tanker. Comfortable quarters for engine room officers and for the crew are arranged in the poop. The captain and deck officers are housed in the bridge erection. The Paraffine Company's Mastipave, applied to the steel deck by Olcotts' Inc., Los Angeles, makes a serviceable and comfortable floor in these quarters.

. . . A Monthly

A Few of the Daily Events Affecting the World

● **August 1.**

French liner Normandie takes Westbound transatlantic record, running from Bishop's Rock to Ambrose Light in 3 days, 23 hours, and 2 minutes, or an average speed of 30.58 knots.

● **August 2.**

Charles Bocking takes over duties as vice-president and general manager of the Alaska Steamship Company at Seattle, in place of T. B. Wilson, retired because of ill health.

● **August 3.**

U. S. Maritime Commission, on behalf of the United States Lines, again called for bids for the building of a companion ship to the popular cabin class liners Manhattan and Washington. These bids will be on a new design developed by the technical experts of the Commission. She is to be 723 feet long, 92 feet beam, and 75 feet depth to promenade deck. She will displace 34,000 tons and be propelled at 22 knots by geared steam turbines. Her passenger capacity will be 1200 and her crew complement 630. The Commission estimates they should get her for $15,000,000.

● **August 4.**

Last three steamers of the Nelson Line, S.S. Buffalo Bridge, S.S. Tashmoo, and S.S. Fort Armstrong, were sold to Tokai Shoyi Kabushiki Kaisha of Kobe, Japan, for scrapping. Total price $130,000. Thus passes from the shipping business a 70 year old Pacific Coast firm.

This date was the 147th birthday of the U. S. Coast Guard.

● **August 5**

National Maritime Union in convention, New York, passed formal resolutions condemning Senator Copeland as being "inimical to Union Labor in his attempt to impose continuous discharge books." One of the outstanding characteristics of the human race is its inability to recognize true friendship.

● **August 6.**

The San Francisco Chamber of Commerce announced that during July, 1937, 445 vessels, with an aggregate net measurement of 1,473,797 net tons, arrived through the Golden Gate.

● **August 7.**

The U. S. Maritime Commission, through its chairman, Joseph P. Kennedy, demands that organized maritime labor settle its internal difficulties, which are holding up the progress of the American Merchant Marine.

San Francisco celebrated its annual Harbor Day.

● **August 8.**

French liner Normandie sets new speed record for Eastbound transatlantic passage, steaming 2,936 nautical miles between Ambrose Light and Bishop's Rock in 3 days, 22 hours, 7 minutes, or an average speed of 31.20 knots.

● **August 9.**

The Pacific Steamship Lines Ltd. made public a plan for reorganization of its financial structure and limited operation of its floating properties, whereby it is hoped that in time all creditors will be paid out in full.

● **August 10.**

All maritime labor on Pacific Coast ships and docks stopped work for an hour as a gesture of protest directed against Hitler and Mussolini.

● **Auugust 11.**

The U. S. Maritime Commission announced a comprehensive survey of the American shipping problem by a group of experts, including: Prof. H. L. Seward, Yale; Prof Thomas H. Healey, Georgetown University; Prof. Grover C. Heubner, University of Pennsylvania; Col. James M. S. Waring, industrial analyst, New York; and Prof. Theodore J. Kreps, Stanford University. A report is expected within two months.

● **August 12.**

Japanese begin battle of Shanghai

● **August 13.**

All American shipowners operating under subsidy contracts were ordered by the U. S. Maritime Commission to have ready by September 1 complete details of their plans for building and financing replacements for every vessel in their fleets over 15 years old. Some order and some headache!!

All banks in Shanghai declared a banking holiday for 3 days.

● **August 14.**

Lord Runciman, "Grand Old Man of British Shipping," dies in his 90th year.

● **August 15.**

Chairman Kennedy of the U. S. Maritime Commission announces to the House Appropriations Committee a five year replacement - shipbuilding program for the American Merchant Marine, contemplating the building of 225 to 250 new ships at an estimated cost of $520,000,000.

● **August 16.**

American flag Dollar liner President Taft took on board the first 100 Americans to leave Shanghai after the battle started. She left for the United States on her regular schedule.

● **August 17.**

President Roosevelt signed the Ship Supply Bill, an amendment to the tariff act exempting from formal entrance requirements all foreign flag ships entering U. S. ports for sea or ship stores. This will enable such a vessel to purchase at any port such items as paint, chain, rope, or anchors, without paying the tonnage dues. It is believed that this exemption will stimulate the business of ship's stores firms, particularly on the Pacific Coast.

Dollar liner President Jefferson took aboard 300 American citizens evacuating Shanghai.

Shipping Calendar

of Shipping During the Month of August, 1937

● **August 18.**

The Armstrong Cork Company of California, subsidiary of the Armstrong Cork Co. of Pennsylvania, purchased a 27 acre site in South Gate, Los Angeles, on which to build a $1,000,000 plant for the manufacture of linoleum.

Dollar liner President McKinley took aboard 200 American citizens evacuating Shanghai.

● **August 19.**

Dollar liner President Hoover arrived at Shanghai after a quick run from Manila with the first contingent of U. S. Marines. She immediately proceeded to load 900 American citizens evacuating Shanghai, and the next day started for Manila.

● **August 20.**

Battle of Shanghai raging. Japanese anti-aircraft shell hits U. S. cruiser Augusta, flagship of the Asiatic squadron, killing one seaman and wounding several.

● **August 21.**

Congress passed Third Deficiency Bill, carrying authorization for the U. S. Maritime Commission to start the first unit of its five year shipbuilding program to modernize the American Merchant Marine.

The 75th Congress adjourned.

● **August 22.**

The merchant marine ensign of Hungary appeared on the Pacific Coast for the first time with the arrival at Los Angeles-Long Beach harbor of the Hungarian steamer Nyugat with a cargo of German coke.

● **August 23.**

Final hearings at Washington before the full Maritime Commission on employment and wage conditions aboard American vessels. This hearing, set for 23rd, 24th and 25th, was limited to facts developed at regional hearings held earlier in the year.

● **August 24.**

Dollar liner President Pierce took aboard 200 American citizens evacuating Shanghai.

● **August 25.**

U. S. Secretary of Commerce Daniel Roper announced the appointment of Commander R. S. Field, U. S. Navy, retired, as Director of the Bureau of Marine Inspection and Navigation, effective September 1. This appointment fills the office left vacant by the resignation of Joseph B. Weaver some months back.

● **August 26.**

During this month the idle ships belonging to the U. S. Maritime Commission and stationed on the Pacific Coast were reduced by 50 per cent, leaving only 2 cargo steamers at Lake Union, Seattle.

● **August 27.**

During the week just passed practically all cargo commitments on ships for Shanghai from Pacific Coast ports have been canceled.

● **August 28.**

Dollar liner President Lincoln takes aboard 200 American citizens evacuating Shanghai.

● **August 29.**

Four large fishing boats of the tuna clipper class were launched from Pacific Coast shipyards during August. Cost of these boats ranged from $135,000 to $200,000 each.

● **August 30.**

Dollar liner President Hoover, on her way from Manila to Shanghai, where she was to pick up the balance of the American citizens desiring to leave that city, was bombed by several Chinese airplanes, the pilots of which mistook her for a Japanese troop ship. Several of the crew and two or three passengers were wounded, and decks and sides punctured in several spots. She was diverted to Kobe following this attack.

CHANGE IN MASTERS

S.S. Point Judith. William Murray, vice J. T. Larsen
S.S. El Cedro .... F. Erickson, vice A. Kroon
M.S. Carriso.. .... A. Kroon vice E. Erickson
M.S. Moto:mates. . Peter Hewitt, vice F. R. Randolph
S.S. Virginia
Harry Manning, vice George V. Richardson
S S. Edw. Luckenbach. R. Neslund vice E. F. Murphy
S.S. J. L. Luckenbach I. F. Murphy vice R. Neslund
S.S. Lena Luckenbach R Punjer, vice C A. Bergman
M.S Trarait .... E. W. Mason Jr., vice Jack Edgerton
S.S. J. A. Moffett Thomas A. Hill vice G. E. Lindley
MS. Seamonger.......... Louis Bohls vice Tom Machado
S.S. Noyo .... John Bostrom vice A. A. Baach
S S. Despatch No. 3. .A. J Kelly vice O. W. Lewis
S.S. K. R. Kingsbury. G. E. Lindley vice E K. Smith
Tug Sea Lion.. .... Ole Jacobson vice R. A. Barker
S.S. Celilo .. .. Abbors, vice Waagen
M.S. Carol.. .... R. J. Hollman vice F. Culverwell
S S. Floridian .... C. T. Gaidsick vice E. J. Anderson
M S Dependable .... Frank Alito vice L. Alito
S.S. Manukai .... K. Hubbenette vice C. L. Brocas

THE AMERICAN FLAG ON THE PACIFIC

The value of an American flag merchant marine in foreign trade has been already amply demonstrated in the present hostilities between Japan and China. When it became highly desirable and almost a necessity to evacuate American citizens, and especially American women and children, from Shanghai, then the American flag vessels of the Dollar Lines were called on and in a period of two weeks, practically on regular schedule, as shown in our monthly calendar of shipping, they took off nearly 2,000 on six liners without casualty of any sort.

To the success of this movement the Dollar shoreside personnel, the Dollar terminals, the Dollar tenders, and the Dollar prestige built up by a full generation of hard pioneering work in the Orient, all contributed their full share. None of these, however, would have been of much value in itself without the fine fleet of Dollar American flag ships plying on regular schedule in round the world and transpacific services.

On the Ways — SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

Rising Costs in Naval Construction

On August 5 bids were opened for new destroyers and were found to be much higher than bids on such vessels opened a year ago. The National Council of American Shipbuilders issued a statement accounting for the higher costs substantially as follows:

(1) Ships are of new and heavier design.

(2) Materials and equipment costs have advanced sharply during the year.

(3) Specifications require more costly materials and require full power shop tests of completely assembled propulsion equipment.

(4) Sharp increase in labor costs and uncertainty as to further increases.

On the bids for the big battleships being much higher than Navy yard estimates the Council points out that:

(1) The contractor has to complete the ship and take a loss if he bids too low, whereas the Navy yard deficiencies on estimates are absorbed by the taxpayers.

(2) Navy yard estimates do not include costs of Social Security taxes (over $1,000,000 for these ships), federal, state and local taxes, maintenance of plant, and insurance.

(3) The Navy yards are not subject to the drastic penalties imposed on the private yards if delivery dates, speed and fuel consumption requirements are not met.

(4) Under the Vinson Act the private yard is not allowed to make a net profit of more than 10 per cent on cost, and must keep full and complete cost records open to Government inspection at all times, and there is no provision for recouping any loss the private yard may take through bidding too low.

Another consideration which leads to high protective bidding by private yards, and which was not mentioned by the Council, is the U. S. Navy practice of making the contractor the "goat." The ships and their equipment are designed and the specifications written by Navy experts. The contractor must bid on these designs and specifications. When the vessel is finished exactly to the design and equipped exactly to the specifications, she is tested by Naval experts and if she does not perform as her designer figured, the contractor, at his own expense, must make her so perform and be penalized for the delay in delivery.

Many a private shipyard in the United States has lost much money trying to make Navy Department designs work up to Navy Department expectations.

Bids Asked for U. S. Passenger Liner

The Maritime Commission has again asked American shipbuilders to bid on a passenger liner to run alongside S.S. Manhattan and S.S. Washington, replacing the Leviathan. This time the tenders are to be on a design and specifications developed by the experts of the Commission, which will embody all the latest developments concerning safety at sea.

The new ship will be somewhat larger and faster than the Mathattan and the Washington, and will have a slightly larger passenger capacity. She will be considered as a model safety liner and, so far as equipment, stability, and ability to stay afloat after puncture of hull are concerned, she is stated to be the safest vessel ever laid out on a drawing board.

The program of the Commission contemplates an American yard cost of $15,000,000 for this ship.

In connection with the building of this vessel the Commission has agreed to take back the Leviathan at a very generous figure, and many suggestions have come to them of commercial uses to which that huge hulk might be devoted. These range all the way from a floating hotel concession to a training ship for merchant seamen.

Let's hope that in this, as in many another effort, "the third time" will carry "the charm" and the United States Lines, the Maritime Commission and an American shipyard will get together on this fine vessel which, when finished, will be the flagship of America's new merchant marine.

The three yards best equipped and qualified for this job are at present quite busy with naval and commercial work, so that it does not seem reasonable to expect that there will be any proportional reduction from the bids turned in on the former proposals for a ship of this general size and type. In fact, labor conditions are so uncertain, and on Government controlled work any disputes with labor are so sure of being settled in favor of labor, that it is difficult to understand how any shipbuilder can give a firm bid on work covering 18 months to two years in the future.

Up with the Sun Tanker Schedules

With eleven tankers in various stages of construction or on order, the Sun Shipbuilding and Dry Dock Company is a very busy ship factory these days. The aggregate deadweight tonnage of the tankers now being built in this yard exceeds 150,000.

Hull 163, a tanker of 12,000 dwt. capacity, was delivered to the Texas Company on July 28.

Keel for Hull 168, a diesel propelled tanker of 18,360 dwt. for the Sun Oil Company, was laid September 1. Her engine is a Sun-Doxford opposed piston diesel.

Hull 161, a 12,900 dwt. tanker for Standard Oil Company of New Jersey, will be launched September 18.

Keel for Hull 169, tanker of 18,500 dwt. for the Atlantic Refining Company, will be laid October 1.

Are we right in asserting that this is the largest program of construction ever under way in an American yard, war times excepted?

Los Angeles Shipyard Gets Contract

After a long period of idleness so far as new construction is concerned, the Los Angeles Shipbuilding and Dry Dock Company has secured a contract and is busy erecting an 8,200 barrel oil barge for the General Petroleum Corporation of California. This craft is for distributing oil in Los Angeles harbor. It has a steel hull with riveted shell and welded bulkheads. The hull measures 139 ft. 0 ins. in length, 40 ft. in beam, and is 14 ft. 0 ins. deep.

Cargo discharging machinery will be installed, consisting of two Heliquad Rotary oil pumps each driven by a 100 B.H.P. Enterprise diesel engine. The piping provides special means for ready and thorough draining of the cargo oil tanks.

Navy Yard Production Record

Officials of Mare Island Navy Yard, on San Francisco Bay, are proud of the record made in building the destroyer Henley and the submarine Pompano. For (DD391) the Henley it had been estimated that she would be delivered sometime in October, 1937. She was put in commission on August 14, 1937, a full two months ahead of schedule. The estimators put the possible delivery of (SS181) the Pompano as late October, 1937. She was put in commission on June 12, 1937, four months ahead of schedule.

Bethlehem Union Plant Progress

Seagoing shallow draft hopper dredge Pacific, for the U. S. Engineers, which was launched July 28, is progressing nicely and will be ready for delivery sometime in October. New destroyers McCall and Maury will both be finished by June 1 next.

New work in prospect includes the big reconditioning job to be done on the Matson liner Malolo this winter. This will be a major operation in stateroom reconstruction and in the installation of new equipment to meet the new requirements of the Bureau of Marine Inspection and Navigation.

Craig Yard Delivers Tanker

The Craig Shipbuilding Company of Long Beach, California, has recently completed the conversion of the coastwise cargo carrier Mazatlan into the coastwise gasoline and diesel oil tanker San Diego for the Star and Crescent Boat Company of San Diego. This vessel is a motorship powered with two 350 B.H.P. Winton diesels. She is equipped with a diesel generating set and diesel driven cargo pumps. Her capacity is 10,000 barrels of cargo in 12 tanks, so arranged that it is practically impossible for the contents of any tank to contaminate any other tank. Complete description and illustration of this ship will be found on page 40 of this issue.

The Greatest Pacific Coast Fishboat

Lake Washington Shipyards, at Houghton, Washington, will this month deliver to the French Sardine Company the 120 foot steel hull fishboat Paramount, which is equipped as a tuna purse seiner. Immediately after delivery she will be sold to Frank Mosich, Bernard Carr and Associates, who will operate her in the tuna fishing out of San Pedro. This boat is really paramount in several respects:

(1) She is the largest purse seiner ever built.

(2) She is the most costly fishboat on the Pacific Coast.

(3) First fishboat on Pacific Coast to be classed by American Bureau.

(4) First all welded fishboat on Pacific Coast.

(5) Cruising radius at sea service speed 11,000 miles.

(6) Capacity for fish in chilled brine 330 tons (net fish).

This boat will be propelled by a 600 B.H.P. at 260 r.p.m. Enterprise diesel engine. She was designed by Nickum and Sons, Naval Architects, Seattle.

Large Contract to Cool the Navy

The York Ice Machinery Corporation, York, Pennsylvania, has just received a contract from the United States Navy Department to furnish air conditioning and refrigerating equipment for 13 destroyers, 3 cruisers, and 3 submarines.

The equipment will be installed in the navy yards at Brooklyn, Philadelphia, Boston, Norfolk, Charleston, Portsmouth, Puget Sound, and Mare Island.

Bath Delivers Trawlers

The Bath Iron Works of Bath, Maine, delivered Hull 175, the trawler Jeanne D'Arc, on September 1, and will deliver Hull 176, the trawler Villanova, on September 15. These two are the last of a group of steel hull diesel driven trawlers built by Bath Iron Works this year for Boston fishing firms.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401)**; completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; launched July 28, 1937.

DRYDOCK AND ROUTINE REPAIRS: **W. S. Rheem, Makaweli, Massmar, Chiriqui, Santa Paula, Pres. Wilson, Point San Pedro, Silverteak, West Mahwah, Manulani, Cuzco, Talamanc, F. A. Douty, Mericos H. Whittier, Silverado, Antigua, Pres. Pierce, D. G. Scofield, Oregon Express.**

GENERAL ENGINEERING AND DRYDOCK CO.

Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Gas. S. Dependable, Solano, Barge No. 101, Barge No. 55, Catherine Sudden, Tahoe, Gas. S. California, Launch Phoenix, Barges Dolphin, Bonita, No. 56, No. 102, and No. 57, Scotia, Midway, Port Orford, Coalinga.**

HARBOR BOAT BUILDING CO.

Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats; 1,600 H.P. each; Liberty-Vimalert conversions;** speed 30 m.p.h. Keels laid September, 1936; estimated launching dates August 21, September 15, September 25, and October 10, 1937; expected completion dates September to October, 1937.

Two 78'x20'x9'6" Lamparo fishing boats; one for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; second for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. Delivery date October, 1937.

LAKE WASHINGTON SHIPYARDS

Houghton, Wash.

NEW CONSTRUCTION: **120' steel tuna vessel**; 600 H.P. Enterprise diesel engine; delivery date September 15, 1937.

DRYDOCK AND ROUTINE REPAIRS: **M. S. Hostford; U. O. Co. No. 3, Seattle.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.

Los Angeles Harbor
San Pedro, Calif.

NEW CONSTRUCTION: **Hull No. 57,** one steel harbor barge 139' x 40' x 14'; 8,200 bbl. capacity; for General Petroleum Corp. of Calif.

DRYDOCK AND ROUTINE REPAIRS: **Tug Milton S. Patrick, Cascade, Cathwood, Tug John N. Stewart, Yacht Seaward, Svend Foyn, Tug Jimmie K, M. S. Moorcot, Tug Listo, Tug Captain William, Kishacoquillas.**

MARE ISLAND NAVY YARD

Mare Island, Calif.

NEW CONSTRUCTION:

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: **Aylwin, Dale, Farragut, MacDonough, Monaghan, Worden, Reid, Mac Leish, McCormick, Simpson, Truxton, Detroit, Houston, Algorma, Pinola, Relief, Thrush.**

THE MOORE DRY DOCK CO.

Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Western Union Barge, Lightship 76, Ferry Yerba Buena, Sobre Los Olas, Santacruzcement, Beulah, Manoa, Santa Monica, Iowan, Celilo, Pennsylvanian, Sea Star, Ferry Hayward, Hollywood, Carolinian, Golden Tide, Tug Hercules, Golden Cross, Isleton, Trejon, Minnesotan, Tulsagas, Oil Reliance, Athelsultan, Santa Elena, Dorothy Wintermote, Inneroy, El Commodore, Hawaiian, Johnny Boy, San Marcos, Tug Virgil G. Bogue, Alabaman, Newrex, Alexander Hamilton.**

THE PUGET SOUND NAVY YARD

Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; estimated completion date, November 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Pennsylvania, Nevada, Saratoga.**

WESTERN BOAT BUILDING CO., INC.

2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION: **Hull No. 127, Yankee Clipper; purse seiner,** 82' x 20'; 200 H.P. Atlas engine; keel laid May 26, 1937; launched July 22, 1937. Owners, Ed. & J. Kaseroff and E. Manaka, of San Pedro, Calif.

Hull No. 128, Santa Lucia, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 15, 1937; delivery date September, 1937. Owner, Frank Cardinale.

Hull No. 129, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 19; delivery date, October, 1937. Owner, Roy Hugiv, Seattle.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Pennsylvania

NEW CONSTRUCTION:

One floating fender, 200' x 7' x 3½', for National Tube Co.

DRYDOCK AND ROUTINE REPAIRS: 9 barges 175'x26'x11'; new sides and knuckles.

THE AMERICAN SHIP BUILDING COMPANY

Cleveland, Ohio

NEW CONSTRUCTION: **Two bulk lake freighters** 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Keels laid June 21, 1937; and July 6, 1937; launching date October, 1937; delivery date April 15, 1938.

(Page 60 please)

Shipping Legislation Comment

(Continued from Page 35)

(d) The Commission is authorized to make a premium charge for the insurance of mortgages under this Act of one-half of 1 per centum of the face value of the mortgage, and such charge shall be payable annually.

Sec. 4. (a) In any case in which the mortgagee under an insured mortgage shall have foreclosed and taken possession of the mortgaged property in accordance with regulations of, and within a period to be determined by, the Commission, or shall, with the consent of the Commission have otherwise acquired such property from the mortgagor after default, the mortgagee shall be entitled to receive the benefits of the insurance, by outright payment of the insurance claim, or by the issuance of debentures to satisfy such claim. The terms and conditions of such payment shall be subject to such rules and regulations and such exceptions as the Commission may prescribe, which shall be substantially in accordance with the provisions applicable as to payment of insurance claims under section 204 of the National Housing Act, as amended. The Commission in connection with the liquidation of the insurance claim shall have the right to maintain, operate, or charter any property acquired in such liquidation or otherwise dispose thereof.

Sec. 5. There is hereby authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act.

Shipping Measures Recently Adopted

In the rush toward adjournment, the Senate passed numerous bills relating directly to shipping and safety at sea.

Foremost was the Copeland bill adopting regulations for preventing collisions at sea. These rules are substantially those contained in Annex II, as amended, of the Convention for Promoting Safety of Life at Sea, signed at London in 1929 and proclaimed by President Roosevelt last year. A section of this measure repeals all laws found to be inconsistent with this bill.

These regulations will become effective upon proclamation by the president.

Another Copeland bill passed that will amend the Merchant Marine Act of 1936 to provide that the Maritime Commission may operate or lease any lands, docks, wharves, piers, or real property under its control and turn the proceeds into its general administrative expense fund. This bill also provides that all sums or money now in the construction loan fund created by the Merchant Marine Act of 1920, together with all other proceeds transferred to the Maritime Commission, shall be placed in the Treasury and maintained as a revolving fund to be available for expenditure by the commission in administering the act.

Other bills passed include the following:

To provide more effectively for the marking of wrecked and sunken craft for the protection of navigation, and to improve the efficiency of the Lighthouse Service;

To permit the transportation of passengers by Canadian passenger vessels between ports or places in the United States on Lake Ontario and the St. Lawrence river;

To require the deposit in a safe place ashore of the names and addresses of passengers sailing on vessels plying the inland or coastal waters of the United States.

This last was introduced as a result of the fire which destroyed the steamboat City of Baltimore on Chesapeake Bay.

Trade Literature

Bulletin 3600-A2, Fairbanks, Morse & Co., describes and illustrates the construction and application of their Model 36-A diesel generating sets.

These sets are widely used in industrial plants, either as independent units carrying the entire load or for parallel or auxiliary operation in conjunction with other electrical service. Their compact design fits them for service on board ship as auxiliary power plants, or as emergency power plants under the new safety regulations. Because of their construction with a substantial common sub-base, they may be installed on simple foundations, making them especially suitable as marine auxiliaries.

True diesel economy and dependability are available in the F-M Model 36-A sets. They represent an outstanding development in the design and construction of unit-built generating plants in comparatively small capacities. They are compact, are easily installed, and can be operated with little attention. Alternating current sets are offered in ratings from 5.3 to 100 kva. and direct current sets from 5 to 80 kw.

"Hard-Facing with Haynes Stellite Products." A new and more complete edition of this booklet is now being issued by Haynes Stellite Company, a unit of Union Carbide and Carbon Corporation. This booklet describes 494 money-saving applications of the hard-facing process.

This is the fourth printing since the booklet was originally published a little more than three years ago. Over 35,000 copies have already been distributed. New sections present information concerning special Haynes Stellite J-Metal cutting tools and the corrosion-resistant Hastelloy alloys. A number of examples of hard-facing, automotive and aircraft valves and valve seat inserts, and the use of Haynes Stellite trim for high-temperature, high-pressure steam valves, are described in detail.

Power and Heat Problems Yield. How fuel costs in the generation of power can often be reduced by 25 to 50 per cent or more is pointed out in a paper entitled "Power and Heat Problems Yield to Improved Alloys and Designs," by C. R. Waller, vice-pres. in charge of engineering, of the De Laval Steam Turbine Co. Recent improvements in the design of steam turbines and in the materials used for their production permit of using steam in the region of high pressures and temperatures. As little additional fuel is required for the generation of steam at high pressure, the efficiency of condensing steam plants can in this way be greatly increased. Where steam is used for processing or heating, even at relatively high pressures, large amounts of power can also be obtained as a by-product, using the turbine as a pressure reducer and heat distributor. The possible savings with steam at various pressures and temperatures are presented in a table.

These engines will operate continuously at rated capacity with no danger of overheating or of strain to any part. Further details will be found in a bulletin now available upon request.

How To Run a Lathe, 33rd Edition. 160 pages, 300 illustrations, numerous tables, compiled and published by the technical staff, South Bend Lathe Works, South Bend, Indiana. Price 25 cents, postpaid anywhere in the world.

The book was originally introduced in 1907 in the form of a 16-page manual. In the last thirty years more than 1,500,000 copies have been printed and are in use throughout the world. It has been printed in four languages and is the standard book of instruction in technical schools, trade schools, and apprentice shops, in practically every country in the world. Used as a handy reference by all engaged in metal working operations, the instruction it contains has proved a great boon for the homeshop enthusiasts and hobbyists, anxious to expand their interest into metal working projects.

Running Lights of Pacific Shipping

● **Shipbuilder**

George A. Armes, president and general manager of General Engineering & Dry Dock Company since its organization in 1921. Formerly chief engineer Army Transport Service, 1901 to 1904. Assistant engineer-in-chief at Bethlehem's Union Plant, 1904 to 1909. Engineer-in-chief 1909 to 1917. Shipping Board officer. President, Moore Shipbuilding Company, 1917 to 1921. A yachting, golfing, hunting enthusiast.

Shipper ●

Joseph Durney, president of Griffith-Durney Co. Previously to launching this company in 1897 was manager of the canned food department of J. K. Armsby Co. . . . now merged with Cal-Pack. One of the "old guard" of the Bohemian Club. For 30 years a member of Encinal Yacht Club . . . formerly commodore. Hobbies strictly nautical: sailing, rowing, swimming.

● **Ship Operator**

Fred M. Rohrer, assistant Pacific Coast manager, Grace Line. Trained in the immortal Pacific Mail school. Rounds out 25 years with his company this month. Navy service in the big war. Away from his desk, a football statistician. Sailed to New York on the Santa Paula on August 6 with his wife and son.

U. K. Range ●

Harry Brown, president of Interocean Steamship Corp. since its origin, 1930. Born in San Francisco, his career has always been associated with traffic. The Southern Pacific, C. & H. Sugar, Dyson Shipping Co. are previous connections forming his background. His line operates in regular service to the U. K., the Continent, the Orient, South America. His golf game, improving . . . his poker, scientific!

● **Timber**

George B. McLeod, vice president of Hammond Lumber Company, Hammond Shipping Company, Hammond Redwood Company. Associated with founder, Mr. Hammond, back on the Blackfoot River in Montana 46 years ago. His company principal operators of coastwise vessels in the lumber carrying trade.

Cordage ●

Herman D. Nichols, vice president of Tubbs Cordage Company. Firm produced first rope in 1856. H. D. joined in 1925 after two grueling years as a cement kiln burner. Has always inclined towards ships . . voyages on a regular beaten track to plantations as far as the Philippines. A bridge commuter, he substitutes the auto radio news flashes for the morning paper. Career: from waterfront salesman to vice president in 12 years!

F. G. Franciscus Receives Promotion

F. G. Franciscus, until recently Oakland Division Manager of the Shell Oil Company, is now Head Office Lubricating Oil Department Manager in San Francisco. For five years prior to the Oakland position Franciscus was Manager of Marine Sales in San Francisco. He launched his Shell career fourteen years ago as a salesman in Southern California. Later he was Manager of Lubricating Oils in the former Central and Southern Divisions. He has a host of friends throughout the Western industrial and maritime world and they join with the Shell organization in wishing him success in his new activities.

F. G. Franciscus.

Newport News Men Transferred to Virginia Headquarters

From **Roger Williams**, vice president of Newport News Shipbuilding and Dry Dock Company, we learn that effective September 1 the following officials of the company transferred their offices to Newport News, Virginia:

Roger Williams, vice president.

James Plummer, purchasing agent.

H. K. Peebles, assistant purchasing agent.

D. G. Moorhead, hydraulic sales engineer.

The treasurer and a representative of the vice president's office will remain at the New York offices at the present address, 90 Broad Street. The purchasing department will also be represented by **J. M. Clawson**, assistant purchasing agent.

J. F. McConkey, Pacific Coast manager for Sperry Gyroscope Company, reports a very brisk business in their aeronautical equipment. He was recently in San Diego to witness the departure of 24 Consolidated United States Navy patrol bombers on a mass flight to Seattle from San Diego Harbor. All of these planes are equipped with Sperry Automatic Pilots. McConkey states that there are 600 of these Sperry Automatic Airplane Pilots being installed in planes building in Southern California plants.

Bravery of Oil Tanker Captain is Rewarded

Bravery of **Captain Hugh McKinnon**, master of the oil tanker Eclipse, was rewarded July 23, when he was presented with an 18-inch, solid silver, gold lined cup by Dr. Andrew O. Nelson, Vice-Consul of Norway.

The presentation, made at the Los Angeles marine terminal of General Petroleum Corporation, was in recognition of the young master's bravery when he rescued five women, eight children and three men from the burning Norwegian motorship Tricolor several months ago.

The rescued passengers were brought from the scene of the fire, 1000 miles off Yokohama, to Los Angeles by the tanker Yarraville, operated by the marketers of Mobilgas and Mobiloil, of which steamer Captain MacKinnon was master at the time.

"This action by the Yarraville's master was another important chapter in the history of ships transporting Mobilgas, Mobiloil and other Mobil products that have been featured in rescues at sea," says A. O. Woll, manager of General's marine department. "Other chapters included the rescue of 14 members of the shipwrecked Diashin Maru by the Java Arrow, and saving of the shipwrecked crew of the Kinsei Maru, off the Japanese coast, by the oil tanker Tuscalusa."

Officers' Club Quarters Transformed

The Merchant Marine Officers Club, occupying the entire mezzanine floor at 23 California Street, San Francisco, within the next few days will have an entirely reconditioned club room. The club has spent quite a bit of money in putting the quarters in top condition for its members, and a complete transformation has been accomplished. The modern decorative scheme, together with the club's facilities and accessibility provides the perfect meeting place for merchant marine officers and their friends. All merchant marine licensed officers are cordially invited to visit the club room, where they will be assured of a sincere welcome. The club is strictly a social organization, its object being to foster the spirit of good-fellowship among the gentlemen of the marine profession. The directors suggest that those officers interested in receiving further information write or visit the Merchant Marine Officers Club, Mezzanine Floor, 23 California Street, San Francisco, or call EXbrook 3868.

Captain Hugh MacKinnon (center) receives cup for bravery from Dr. Andrew O. Nelson, Swedish Vice-Consul (left) while Lloyd J. Moore (right) Assistant Marine Manager for General Petroleum Corporation, enjoys the ceremony.

Names and News

E. S. CROSBY

Lewis H. Brown, president of the Johns-Manville Corporation, has announced that E. S. Crosby has been named president of the Johns-Manville International Corporation, a subsidiary.

Crosby joined the company in 1928 when it absorbed the Celite Company, of which he was vice president and a director. His first position with J-M was as general manager of the engineering department. In 1929, when the Johns-Mansville International Corporation was formed, he became vice president and general manager. The presidency of the International Corporation has been held by Mr. Brown

In addition to his new post, Crosby is also general manager of both Asbestos Fibres Distributors and the Department, both divisions of the Replacement Automotive Products J-M Sales Corporation.

JOHNS-MANVILLE PROMOTIONS

Seven promotions, including the election of three new vice presidents of the Johns-Manville Products Corporation, were announced on August first by Lewis H. Brown, president of Johns-Manville Corporation.

The new vice presidents are: A. R. Fisher, formerly manager of the company's largest factory at Manville, N. J.; J. P. Kottcamp, who has been the manager of the Mid-Western factory at Waukegan, Ill.; and Alexander Cromwell, currently manager of the Pacific Coast manufacturing operations.

J. E. Begert, formerly head of the Cost Reduction Department at headquarters in New York City, has succeeded Fisher as manager of the Manville plant.

At the Waukegan factory K. W. Huffine, formerly manager of the Alexandria plant, has been named to succeed Kottcamp as manager.

H. J. O'Brien, formerly superintendent of the Rock Wool Department at the Manville factory, has become manager of the Alexandria plant.

W. Kelty, who was assistant to Begert in the Cost Reduction Department, succeeds him as manager of that department.

CARLETON V. LANE PASSES

On August 26 Carl V. Lane, one of the best known and best loved leaders of the marine engineering industry at San Francisco, passed away at his home in that city after a long illness.

Born at Bedford, Indiana, in 1879, Carl Lane came to San Francisco at the age of 8. After the grammar schools he became apprenticed as a machinist in the Union Iron Works under those famous developers of young men, "Dan" Fraser and "Mike" Haley.

Studying hard in the rather crude evening schools of those days, Carl progressed to the engineering side of the drafting room. There he rose to be chief draftsman and held that position during the hectic years of the great emergency shipbuilding program, when this Union Plant of the Bethlehem Shipbuilding Corporation Ltd. was making marvelous records in the construction and outfitting of both merchant and naval vessels.

In 1921 Lane left the Bethlehem Shipbuilding Corporation to join the Ford & Guerrine staff, then operating as a coastwide agency for a number of manufacturers of marine machinery and equipment.

This agency was purchased by the late A. L. Becker, and Carl Lane went along and in 1926 purchased the agency accounts from Becker, who devoted himself to consultation work exclusively.

Carl Lane was the best type of self-made man, earnest, studious, and possessed by a friendly spirit that brought to him much friendship. He will be much missed by many San Franciscans.

CHARLES BOCKING

On August 1, Charles Bocking, well known executive at Vancouver, B. C., became vice president and general manager of the Alaska Steamship Company, succeeeding T. B. Wilson, retired from that post because of ill health. Rocking was formerly connected with mining interests, spending the last 15 years in Vancouver, from which point he has been well able to familiarize himself with Alaska and Far North trade. Wilson continues as a vice president, at present being on a leave of absence.

CAPTAIN JOHN G. UHREN

Captain John G. Uhren, master of a number of Union Oil vessels during the 22 years of his service with the company, died July 13 at St Luke's Hospital in San Francisco after a long illness.

Uhren, who was captain of the Deroche for ten years, had been ill for six months, but had seemed to be improving in health when the end came The news of his death came as a great shock to all his friends in the marine industry.

Born in Aslesund, Norway, on March 2, 1881, Captain Uhren started his career as a seaman in Norwegian sailing vessels at the age of fourteen. He made his first trip to America in 1902, sailing around the Horn in an American windjammer, and has remained on the Pacific Coast since that time. In 1908 he became an American citizen, and was in seasonal service from time to time on the Alaska Packers' sailing vessels. Before entering the employ of the Union Oil Company he was in charge of the pilot boat for San Francisco Bay.

Uhren had been with Union Oil Company since April, 1915, and had served in various capacities from third officer to master until May 30 of this year, when he was stricken with the illness which caused his death.

He is survived by three sons, Helge, Peter, and Clarence, all of San Francisco. His wife died about five years ago.

WORLD'S GREATEST PORT BUSY

Shipping activity in the Port of London during 1936 was the highest on record. During the past year 62,168,853 net registered tons of shipping used the Port, compared with 59,762,150 net registered tons in 1935, an increase of 4 per cent.

A feature of London's shipping last year was the large number of newly constructed vessels placed in commission for employment between London and various parts of the world.

Propeller Club of California News

● **First After-Vacation Luncheon Meeting Scheduled**

Bryant O'Connor, program committee chairman of the Propeller Club of California is announcing the "sailing date" of the first after-vacation meeting as Tuesday, September 14. The meeting will be held at the familiar quarters in the Fairmont Hotel.

Chairman O'Connor is developing a program of exceptional interest.

Our guest speaker will soon be announced through the customary channels, and a record breaking attendance is anticipated to observe the launching of the good ship "Propeller" on the second lap of the 1937 voyage.

Come aboard, shipmates, and meet your friends!

● **Golfers Attention!**

Sid Livingston will soon pipe all hands aboard for the fall golf tournament.

Yes, sir! The Golf Committee, which Sid heads, is already surveying the situation, and time, place and details will soon be announced.

● **New Members**

Secretary Stanley E. Allen sends us the good word that the following new members have been registered:

Capt. Oscar Orsland, McCormick S. S. Co.

Capt. Oscar Vera, Standard Oil Company of California.

K. V. King, Standard Oil Company of California.

IN MEMORIAM

The Club mourns the passing of **Carleton V. Lane.**

Lifeboat Group

Joseph P. Kennedy, United States Maritime Commission chairman, will preside at the Eleventh Annual International Lifeboat Races to be held September 11 off Bay Ridge, Brooklyn, with two events, one for the world championship in regulation lifeboats, and another in U. S. Coast Guard monomoy surf boats.

Entries in the surf boat race for the International Lifeboat Association cup donated by J. W. Powell, which will be run over the same two mile course as the lifeboat race, include the United Fruit Company, Colombian Line, Furness, Withy & Co., Ltd., Standard Oil Company of New Jersey, Hamburg American Line, North German Lloyd, Standard Fruit Company, The Texas Company, United States Lines, and the Maersk Lines. In the World Championship races for the Robert L. Hague trophy two strong contenders, the Italian Line and the Standard Oil Company of New Jersey, each with two legs on the cup, which must be won three times, will race for permanent possession with the only other entry, the French Line.

Other officials announced by J. J. Kelleher, president of the association and vice president of the United Fruit Company, include: Committee of Arrangements, Fred B. Dalzell, Chairman; Captain J. F. Milliken, Paul Revere Smith, M. D. Stauffer, Comm. A. G. Hall, E. P. Rees, H. J. Esselborn, William J. McDonal Lieutenant P. D. Mills; Brookly Committee, Hon. M. J. Troy, chai man; Referee, Hon. Edward P. Mu rooney; Judges, Sir Gerald Campbel (England), Admiral R. R. Waesch (U.S.), Count Charles de Ferry d Fontnouvelle (France), Hon. S Klingensberg (Norway), Hon. Gusta A. Miller (Germany), Comm. Gaeta no Vecchiotti (Italy), Hon. Georg Bech (Denmark); Honorary Judges Captain J. F. Hottel, James French J. L. Luckenbach, Captain T. H. Taylor, Captain Gaetano Giallorenz William Bennett, John Daly, Captai Thomas H. Molloy, Hon. H. M. Durning; Judges of the Course, Captai Granville Conway, E. P. Rees, Captain George Fried, P. A. Kjeve, Joh Sirignano; Course Patrol, Commander A. G. Hall (U.S.C.G.), Captai H. A. Malley (N.Y.P.D.), Captain A W. Wallander (N.Y.P.D.); Commander Chester H. Jones (U.S.C.G.) Commander J. S. Baylis (U.S.C.G.) Surgeon General, Dr. William H Bishop; Starters, Paul Revere Smith Official Starter, G. W. Milliken, Ber L. Todd, Captain T. T. Tonnesen Timekeepers, Willard F. Jones, Official Time Keeper, R. J. Baker, R. K Kelly, James O'Connor, Arthur Tode Rules Committee, Captain C. C. Baldwin, Chairman, Captain Wm. F Drechsel, Vice Chairman, Captain H A. Cunningham, Captain S. Christensen, Captain Wm. H. Lee, Captain L LeFriant, Captain Marcus Hegmann Captain H. N. McDougall, John Sirignano; Inspection Committee, E. L Stewart, Chairman, Captain Karl C Nielsen, Vice Chairman, C. S. Durfee, A. D. MacCorkindale; Ballas Committee, Captain H. N. McDougall, Chairman, Captain J. Elligers Captain Piero Bonelli, Captain C Lindholm, A. Warner Melvin, Huber M. Vanderbilt; Officers, J. J. Kelleher, President, Fred B. Dalzell, Vice President, Captain John W. McGrath Vice President, Robert F. Hand Treasurer, M. D. Stauffer, Secretary Wm. A. McGonagle, Assistant Secretary, Captain John F. Milliken, Vice President; Directors R. L. Hague Willard F. Jones, Hon. Frank J. Taylor, J. McAuliffe, Joseph W. Powell, L. LeFriant, E. F. Johnson, Captain Wm. Drechsel, E. P. Rees, Italo E. Verrando, Hon. Edw. P. Mulrooney, John D. Reilly, John M. Franklin, Ira A. Campbell, Hans C. Henriksen.

PAPPY WAS A'HUNTING

Gene "Red Eye" Hoffman, terror of Etowah county, Alabama, is back in his home port, San Francisco. Gene's pappy was after revenuers so Gene was tending still in the hill country of Northern Alabama, near Gadsden when this "candied" shot was made. Today Gene is back on the job as publicist for the Dollar Lines.

By Sea and Air Over North Pacific Coast

(Continued from Page 24)

sources would build up in Alaska a great commonwealth that would soon be ready for statehood. Certainly there is much to be said on both sides of this question.

The present Federal administration is constantly reminding us that there are no more frontiers of fertile soil. Yet here it has in Alaska millions of acres of frontier land with tremendous opportunities for subsistence farming and later on, as the territory fills up, for specialized farming.

Pacific Coast communities should take more interest in the development of Alaska and should lend her their poltical strength to get more favorable action at Washington. Whatever trade values the future shall build for Alaska will be equally important to the Pacific Coast states. Alaska trade will always be Pacific Coast trade.

As Mary Lee Davis puts it in picturesque metaphor, Alaska is "Uncle Sam's Attic," in which there are stored many rare and rich treasures for those who earnestly seek to find. There is land for the farmer, gold for the miner, furs for the trapper, beef for the drover, rich silver treasure for the fisherman, and in all a great store of business for the American merchant marine.

Pacific Port Notes

(Continued from Page 39)

Kirkpatrick recently completed surveys of a similar nature at San Francisco, California, and at Mobile, Alabama.

The American-Hawaiian Steamship Company reports that in June of this year their fleet loaded: 35,574 weight tons out of Puget Sound ports; 22,692 tons out of San Francisco Bay; and 9,976 tons out of Los Angeles. It will be noted that the Puget Sound tonnage exceeds the combined tonnage of the other two districts by more than 1,000 tons.

The lumber production of the States of Oregon and Washington aggregated 8,649,821,000 board feet, an increase of 34 per cent over the yield for 1935, but still more than 25 per cent below the peak of 1929, which topped 12 billion feet. Over 6 billion feet of last year's total was the variety known as Oregon pine, 60 per cent of which was cut in the State of Washington.

An unusual cargo in August was 600 tons of Chinawood oil in bulk, brought to Seattle in the deep tanks of the American Mail Line steamer President Grant.

Puget Sound freight rates by boat were radically increased during the month by order of the Washington State Department of Public Service. In many cases the rise was 50 per cent or more. The shipowners are protesting vigorously against this raise, since they know that it largely cancels the differential between water and truck rates, and they therefore assume that, instead of producing an increase of revenue for the water lines, the raise will divert business to the truck lines.

● Columbia River.

Columbia River and the ports of Washington are getting ready for the big seasonal movements of apples and of other food products. The annual fruit shipping schedules are coming out. These show that 103 refrigerated cargo vessels will be on berth between August 1, 1937, and January 1, 1938. The insulated chambers of these ships have an aggregate capacity in refrigeration stowage for over five million boxes of apples.

Burchard and Fisken, Inc., of Portland, has been appointed Columbia River agent for the East Asiatic Co., Ltd., and this line will use Oceanic terminals as its regular berth.

● Southern California.

During the week of August 7, 131 vessels entered the harbor of Los Angeles and Long Beach.

A little more than 10 per cent of the entire nation's export of scrap metals has been going out of Long Beach during recent months. Much of this is old automobiles. As one junk dealer puts it, "The initials of many a Los Angeles business man are on the shells now being used by both sides at the battle of Shanghai."

The annual import movement of corn from the Argentine began with the arrival of the Norwegian tramp Alaska. She unloaded 7,000 tons. Approximately 100,000 tons are expected before the end of the season.

On August 23 the States Line's North Pacific-Orient passenger service will be abandoned with the arrival of their steamer General Pershing from Yokohama. From Los Angeles she will proceed to New York to be turned back to her owners, the United Fruit Co.

Names and News

V. B. WINDLE

Announcement was made by E. N. Tormey, district manager of Interocean Steamship Corporation, of the appointment of V. B. Windle as assistant traffic manager specializing in Oriental solicitation for the Kawasaki Kisen Kaisha at Los Angeles. The appointment was effective as of August 15.

Windle was in the Los Angeles freight office of the Dollar Line for over eight years, and for six years was assistant agent in the Singapore office. During the past year he has been with the Seaboard Transportation Company and StorDor Express Company in Los Angeles.

WILLIAM PATTON

The marriage of William Patton, member of the freight department of the Grace Line, and Miss Shirley Ives, took place on August 15 in Alameda. Members of Grace Line presented the groom with a traveling bag. Before the marriage Patton was host at a dinner, with Clarence Nelson presiding as toastmaster.

JOHN L. BURNSIDE

After spending more than 50 years in the shipping business, John L. Burnside, well known figure in Seattle and Alaska shipping circles, has retired. He was the first president of the Maritime Association of Seattle. The Puget Sound agency of the Alaska Commercial Company, held for many years by Burnside, will now be carried on by the Northern Commercial Company.

ROBERT F. JORGENSEN

A newcomer to the Pacific Coast is Robert F. Jorgensen, who comes to Los Angeles to represent Isbrandtsen-Moller Company, Inc., the largest shipping concern of Denmark. Offices are located in the Financial Center Building.

J. G. McNAB

In Montreal during the last of July, J. G. McNab, foreign freight agent for Canadian Pacific, passed away after having recently been transferred to that city. He was well known on the Pacific Coast, and was stationed at Vancouver for a number of years.

McCORMICK PERSONNEL CHANGES

Changes in McCormick's Los Angeles personnel, announced by J. L. Hook, Jr., district manager, were:

W. E. Davis, promoted to sales department of Chas. R. McCormick Lumber Company as lumber salesman; R. R. Abbott, taking Davis' place as lumber handling and freight solicitor for Inner Harbor Terminals Company; Ira Haas, in the place vacated by Abbott, rate desk of the general office of McCormick Steamship Company; and Harry Saner, taking over Haas' post on the billing desk in the Wilmington office.

Captain J. B. Stene of the tanker Deroche.

FRANK HICKS

Crane Co., manufacturer of valves, fittings, heating and plumbing equipment, announces the beginning of a new publicity service in the general office, Chicago. Frank Hicks has been added to the staff to handle this development. He comes to the Crane organization with 17 years' experience in newspaper, trade magazine and general publicity work.

Captain Aids Study

For "helpfully assisting in the study for determining vessel squat in connection with a survey of a 40-foot channel in Delaware River from Philadelphia to the sea," Captain J. B. Stene, master of the Union Oil Company tanker Deroche last month received a certificate of appreciation from the U. S. Army Corps of Engineers.

Vessel squat, the difference in draft when the vessel is lying idle and when it is in motion, is determined by sighting from fixed marks on the shore of the channel to marks upon the ship's hull. By determining the squat the maximum speed and tonnage which may be allowed in a channel of known depth may be found.

Stene aided in the survey when he took the ship East in December. It is considered an honor to be singled out for assistance of this kind, as perfect coordination between the ship's master and the shore crews is necessary for accurate measurement.

W. H. SCHERER

The appointment of W. H. Scherer as manager of Worthington Pump and Machinery Corporation's plant at Holyoke, Massachusetts, has been announced. Scherer goes to Worthington after thirty years of service with Westinghouse Electric & Manufacturing Company, having been general superintendent of the latter's East Springfield Works for the past eighteen years.

At Holyoke, he will be in charge of the manufacture of equipment recently transferred from the corporation's plants at Harrison, New Jersey, and Buffalo, New York.

E. J. AMAR, Jr.

Re-elected to their respective posts as president and vice president of the Los Angeles Harbor Commission, E. J. Amar, Jr., and G. E. Arbogast have begun heir new terms. The posts are filled for a period of one year.

Progress of Construction

(Continued from Page 46)

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson. DD395 Davis** and **DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and **DD410, Hughes, two 1500-ton destroyers** for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; launched August, 1937; estimated delivery, February, 1938.

Annapolis, West Point, Yale; three diesel drive trawlers for General Sea Foods. Estimated delivery October, 1937.

Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil tankers**—steam—425'x64'x34' for Gulf Oil Corp.; total tonnage 7070 each.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

One barge for Socony-Vacuum Oil Co., Inc.; 260 feet long; non-propelled. Estimated delivery date October, 1937.

BOSTON NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; launching date February 1, 1938; estimated delivery indefinite.

DD415, O'Brien, and DD416, Walke, two destroyers; LBP 341', beam 36', depth 19'8"; delivery dates, August, 1939, and October, 1939, respectively.

One large harbor tug for U. S. Navy; delivery date 1938.

BROOKLYN NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, Brooklyn, light cruiser, L.B. P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936;

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estimated delivery, November 1, 1937.

CL 48, Honolulu, light cruiser; L.B.P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935; launching date August 26, 1937: estimated delivery, May 1, 1938.

CL 50, Helena, light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

IRA S. BUSHEY & SONS, INC.
Foot of Court Street
Brooklyn, New York

NEW CONSTRUCTION: One 76' all-welded diesel towboat of 550 H. P., for private party. Delivery date September 1, 1937.

CHARLESTON, S. C., NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for one harbor tug; LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'; keel laid August 2, 1937.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: Two trawlers for the Portland Trawling Company; 146'6"x25'x14'2".

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One lighthouse tender, Elm, 72' 4" x 17' 0" x 6' 6", for U. S. Bureau of Lighthouses. Two diesel engines 300 h.p. total. Estimated keel laying, March 15, 1937, delivery date, September 15, 1937.

One diesel yacht, powered by 1,000 h.p. Winton engines; 143' long, 23' beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION:

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100'x26' x6'6"; 330 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Shipping Company; 600 gross tons.

Hull No. 1424; one welded type W-3 coal barge 175' x 26' x 10'8"; for stock; 472 gross tons.

Hulls Nos. 1427-1428, inclusive; two welded steel covered lighters 110' x 33' x 9' 6"; for Reading Co., Philadelphia, Pa.; 1120 gross tons.

Hull No. 1429; one steel ferry flat 64' x 14' x 3'; for Marchand Ferry Company; 21 gross tons.

Hull No. 1430; one welded steel barge 255' x 40' x 14'; for Kieckhefer Container Corp; 1600 gross tons.

This makes a total of 11 hulls with a total gross tonnage of 4,463 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936; launched August 25, 1937.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October 22, 1937.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937.

Hull No. 30, Saury (SS189); keel laid June 28, 1937.

Hull No. 31, Spearfish (SS190); keel laying date September 9, 1937.

Hull No. 33, Seadragon (SS194); 1450 tons.

Hull No. 34, Sealion (SS195); 1450 tons.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; keels laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, DD397 Benham, DD398 Ellet and DD399 Lang, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing. Hull 143, Esso Bayonne, keel laid December 16, 1936; launched July 24, 1937. Hull 144, keel laid February 8, 1937.

Two destroyers, DD411 and DD412.

Two 12 900 ton tankers for Pan American Petroleum & Transport Co.

Hulls Nos. 149-150, two 12,900 ton tankers for Pan American Petroleum & Transport Co.; Isherwood Arcform design of hull form and longitudinal hull framing. Estimated completion date October, 1938.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8'. Probable launching date September 21; delivery date, approximately Oct. 15.

One steel vegetable oil barge for New York Tank Barge Co., N.Y.; 650 tons gross; capacity 1250 tons; 195 x 42 x 12. Estimated launching date September 1, 1937; estimated delivery date September 25, 1937.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all-welded steel diesel tugboat; 74' long, beam 19', depth 9'; equipped with 380 H.P. Atlas Imperial engine; for Higman Towing Co., Orange, Texas. Delivery date, September, 1937.

One all welded oil barge 100' x 28' x 7'6" for H. B. Messenger, Federalsburg, Md. Delivery date September 1, 1937.

One all welded towboat for Pan American Petroleum and Transport Co., Texas City, Texas; LOA 64' 11", beam molded 18', depth molded 7'6"; equipped with 380 H.P. Atlas Imperial diesel. Delivery date September 1, 1937.

One all welded oil barge for Pan American Petroleum and Transport Co., Texas City, Texas, 173' x 39' x 8'6". Delivery date October, 1937.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: One single screw, electrically welded, steel oil tank steamer. 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,-700,000 gallons of oil. Estimated launching date, August, 1937; delivery date, October, 1937.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: One double ended steel diesel ferry boat, 208' x 62' x 9', for the Claiborne-Annapolis Ferry Company; delivery date May, 1938.

DRYDOCK AND ROUTINE REPAIRS: Converting William A. McKenney from a general cargo vessel to a self-trimming collier.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935. No. 412, launched May 8, 1937.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: H 359 aircraft carrier CV5, Yorktown, for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying, August, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6". Keels laid May 24, 1937.

PHILADELPHIA NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404**, 1500 ton destroyer; no dates set.

PORTSMOUTH, N. H., NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; **launching date August 24, 1937**; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8".

SS192, Squalus, submarine; contract period started December 1, 1936; L.B P. 302'6", beam 26'10", loaded draft 16'8".

SS196, Searaven, submarine; completion date February 1, 1940.

SS197, Seawolf, submarine; completion date April 1, 1940.

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L. O. A. 184', L.B.P. 163', beam molded 35', depth molded amidships at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launched June 22, 1937; delivery date, October, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively. Keel laid for first ship May 20, 1937.

SPEDDEN SHIPBUILDING CO.
Baltimore, Md.

DRYDOCK AND ROUTINE REPAIRS: **Derrick Lighter Roanoke, Tugs Hilton, Baldrock, America, Baltimore, Storm King and Columbia. Ferry Howard W. Jackson, Yachts Ohbee II and Kipp, Fishing Vessel E. Warren Edwards.**

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, **launching date September 18, 1937**; delivery date October 2, 1937. No. 162, launching date October 16, 1937; delivery date November 6, 1937.

Hulls Nos. 164 and 165, two diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 164, keel laid December 15, 1936; launching date October, 1937; delivery date November 1, 1937. No. 165, delivery date, March, 1938.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T. **Keel laid September 1, 1937.**

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; keel laying date October 1, 1937; delivery date, September, 1938.

Hull No. 170, one single screw steam tanker for Bernuth, Lembcke Co., Inc., New York; length 462'4"; beam molded 65' 0"; depth molded 35' 0", DWT approximately 12,900 tons. Keel laying date October 23, 1937; delivery date June, 1938.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery October 15, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively. 840 and 841 launched May 7 and June 3, 1937; 842 indefinite; estimated delivery indefinite.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 14, May 24, and July 22, 1937, respectively; launching and delivery date indefinite.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6". Keels laid June 8 and July 22, 1937; **estimated launching dates September 7 and September 14, 1937; estimated delivery dates September 10 and September 17, 1937.**

CRANE PLANT
27th Street, Brooklyn, N.Y.

Hull No. 849, ferryboat John J. Walsh, for the Westchester Ferry Corp., Yonkers, N.Y. LOA 153', beam, extreme, 48', depth 14' 6". Estimated keel laying May 24, 1937; **estimated launching, August 23, 1937; estimated delivery, September 12, 1937.**

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3 New F-M Bulletins

Bulletin 6205: Describes Fairbanks-Morse Steam Pumps, suitable for a wide range of pumping applications. These pumps have been designed to pump water, oil and similar liquids at pressures up to 420 lb. per sq. in. in quantities up to 464 gal. per minute.

Both the F-M General Service and Low Service steam pumps are of the duplex piston pattern type. General Service units are offered in one-piece and two-piece patterns. In most sizes of Low Service pumps, the steam and fluid ends are cast separately, then assembled, forming the two-piece pattern.

Numerous refinements in design and construction contribute to extra dependability and efficiency. Accurately made parts are carefully assembled by experienced workmen, and completed pumps must satisfy rigorous tests before leaving the factory.

Bulletin 6920 deals with oil lubricated deep well turbine pumps used for most applications; **Bulletin 6920R** covers water lubricated units, which are used where the water must be kept pure and clean and oil lubrication is not permissible.

Both types, oil and water lubricated, are available in sizes from 4 to 16 inches and in capacities from 10 to 2300 gallons per minute with lifts ranging to 400 feet. They are efficient pumping units, requiring a minimum of power, and have a record for low maintenance cost. Heads can be furnished for belt, gear, combination motor and belt, and combination motor and gear drives.

Where the drive is a Fairbanks-Morse electric motor, diesel or gas, gasoline or kerosene engine, the user enjoys the advantage of undivided responsibility for successful operation of both pump and drive.

Marine Shop Produces Useful Fire Department Tool

Close up of Bermingham mechanism for operating high pressure valves.

In the maintenance of modern ocean going steamers practically every mechanical problem is met and solved. The experience gained from the use of brains and machine tools in this work is often extended shoreward with great benefit to the landside application.

An interesting example of this is shown in the illustration herewith, which shows a mechanism for applying power to the opening and closing of the valves of the auxiliary high pressure water supply system for fire protection.

These valves are usually in manholes well below the street level, and with a manually operated extension wrench the opening and closing of such a valve means several minutes. Usually such openings are made only in cases of emergency, where even seconds count.

The idea of applying the mechanical energy available in the power take off of a truck appealed to the chief engineer of the San Francisco Fire Department, and a unit of the general type illustrated was built and tried out with a Ford truck. This developed a few kinks that had to be straightened out, but on the whole worked so satisfactorily and so quickly that it was considered advisable to design a standard tool along these lines.

The design work was done in the engineering department of the Bureau of Public Works, and an order for the first installation of these tools is now completed at the San Francisco shop of the General Engineering & Dry Dock Co.

This mechanical operator for high pressure valves consists essentially of five units. Unit No. 1 consists of a cast iron housing containing two shafts connected by bevel gears. The horizontal shaft has a coupling for power connection. The vertical shaft at its upper end carries a pinion for engaging the internal spur gear of Unit No. 2. Unit No. 2 is a combined housing and stand which carries the vertical drive shaft up from the internal ring gear to a bevel gear in Unit No. 3. The latter unit is a housing capable of being turned 360 degrees on the top of Unit No. 2, and containing a pair of bevel gears mounted free on a hollow horizontal shaft with a friction clutch keyed to the shaft between the gears, thus forming a reversing unit. This horizontal shaft extends into Unit No. 4, which houses a telescopic arrangement allowing extension of the horizontal shaft for adjustment purposes. At the outer end of this horizontal housing is Unit 5, a housing containing an assembly of bevel gears to connect the horizontal drive shaft to a vertical spindle through a spring loaded slip plate. On its lower edge Unit No. 5 carries a spotlight for illuminating the manhole.

All of these shafts are run on ball or roller bearings and are freely lubricated. The finest type of materials available are used throughout. The assembled units are practically a drill press drive and are machined and finished with the same care given to fine machine tools.

A large break occurring in water mains would make it necessary to close two or more valves as soon as possible to prevent extensive water and other utility damage in streets, building basements and their foundations. For example, the valve

A Ford truck supplies the power to drive the Bermingham valve operator.

opening and closing mechanism would require only ten minutes to close one valve, whereas it would require four men 35 minutes to close (based on 18 inch valve).

This valve opening and closing mechanism is considered indispensable to cities with high pressure distributing systems, and also to domestic supply distributing systems having valves 18 inches in diameter or larger.

The unit as herein shown has sufficient power and torque to easily open or close an 18 inch gate valve at a pressure of 300 lbs. per square inch, sliding on the face of valve seats with one side of valve disc exposed to the atmosphere.

Samuel Bermingham, Superintendent of Equipment of the San Francisco Fire Department, with the view to reducing to a minimum the damages as stated above, is given credit for the design and its application to the High Pressure Distributing System. On several occasions the valve opening and closing mechanism now in service in the department has rendered valuable service in main breaks and also in the operation generally in repairs to gate valves.

Stepping the mast.

New Methods of Steel Construction Used on Successful Cup Defender Ranger

Closeup of mast.

Ranger was designed by W. Starling Burgess, designer of last year's America's Cup winner, Rainbow, as well as the previous Enterprise. Burgess' father, before him, designed three America's Cup winners. Bath Iron Works, Bath, Maine, builder of many America's Cup boats, built Ranger. She is all-steel construction and utilizes arc welding extensively. The Lincoln Electric Company's shielded arc process of welding was used in construction.

Ranger is 135 feet $5\frac{1}{4}$ inches long overall, 87 feet at the waterline, 21 feet maximum beam and 15 feet draft. Her mast, 165 feet long, 22 inches by 14 inches at the base, 11 inches by 7 inches at the top, will carry between 6000 and 7000 square feet of main sail. To obtain the strength required to withstand the terrific stresses of this tremendous sail area, and to keep weight at a minimum, the mast was fabricated of duralumin welded by the electric arc process. To counterbalance the draw of her mammoth sails, Ranger has a lead keel weighing 110 tons, heaviest ever used on an America's Cup boat. This tremendous weight is held in place by a flat keel plate of arc welded steel to give the required strength without extra weight. The stresses to which the mast and keel plate are subjected when the Ranger is underway with all sails drawing are terrific. The force applied by wind against the huge sails tends to push the mast one way. The 110 ton keel, pulled downward by gravitation, pushes the opposite way.

In addition to mast and keel plate, the Ranger's stem, her rudder and stern frame are arc welded for greatest strength per pound of weight. The stem is fabricated of three plates, 48 feet long, $4\frac{1}{2}$ inches wide and $\frac{5}{8}$ inch thick. Use of electric welding in construction made it possible to fabricate the stem to conform exactly to the lines of the hull and at the same time to obtain a much stronger and considerably lighter member than by the old method of casting the stem.

Ranger's rudder, another part of her structure which must resist extreme stresses, is entirely weld fabricated. It is 13 feet in length and 4 feet maximum width. The construction consists of various steel shapes and plate cut to conform to designed size and form then fused into a single unit by the electric arc.

PACIFIC MARINE REVIEW

OCTOBER, 1937

PACIFIC MARINE REVIEW

OCTOBER 1937
VOL. XXXIV NO. 10

CONTENTS

Our Cover

The Dollar Line flagship S. S. Hoover made first page news last month in her spectacular rescue of American citizens under fire from war torn Shanghai, and justified her value as a naval auxiliary in her fast dash from Manila to Shanghai with American marines to reinforce the guards at the American embassy.

Through the courtesy of the General Electric Company we are enabled to use for our cover their copyrighted color picture of this fine vessel.

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PACIFIC MARINE REVIEW

VOLUME XXXIV OCTOBER 1937 NUMBER 10

An Auspicious Beginning

For Our Shipbuilding Program

As we are going to press comes the very welcome news that the U. S. Maritime Commission has granted a contract for the building of a first class passenger liner to run alongside the liners Washington and Manhattan in the transatlantic New York-Southampton-Cherbourg passenger service. This is the first shipbuilding contract awarded under the Merchant Marine Act of 1936.

This news is most welcome, because this vessel was the most difficult and most costly problem in the announced shipbuilding program of the Maritime Commission, and since this problem has been solved it is very probable that we shall soon see the entire program under way. Some idea of the difficulties involved in coming to a decision on this problem are evident from the long delay and the large amount of intricate design and calculation work involved. The bid on which this contract is being awarded is one of three bids that form the seventh set of bids on the seventh design prepared for this vessel during the past two years.

If press reports are correct, the ship is to be built on a bid of $15,750,000 adjusted price basis. By accepting on an adjusted price basis the Maritime Commission agrees to absorb any increases in material or labor costs during the life of the contract, and up to 15 per cent of the contract price.

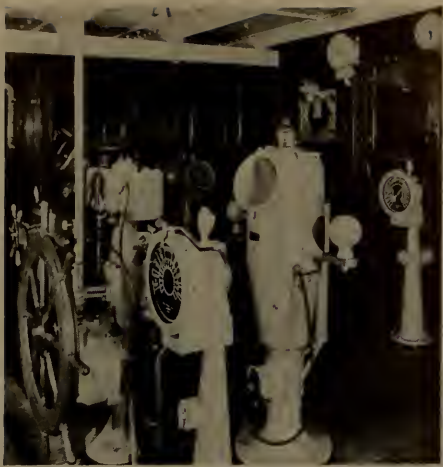
Again news of this award is most welcome because of the construction-differential subsidy provisions of the contract. If the press reports are correct, the Maritime Commission has granted 33-1/3 per cent of the cost as a construction subsidy. This 33-1/3 per cent was declared to be justified because ships of similar type, size and speed could be built in a Dutch shipyard for less than two-thirds of the American cost, and although the British companies are the major competitors on the route involved, these British companies can build in Dutch yards, and the Dutch, too, are more than minor competitors on the route.

All this indicates that the Maritime Commission are inclined as a body to take a broad, liberal attitude in carrying out the spirit as well as the letter of the Merchant Marine Act of 1936.

We may therefore look forward to a prosperous and busy time for shipyards in America, not only on the Atlantic Coast but also on the Gulf and on the Pacific.

Newport News Shipbuilding and Dry Dock Company is the successful bidder. They have undertaken to build the vessel in 852 days and will no doubt finish her before that time has elapsed.

This contract means some measure of increased work for many industries in the United States. In fact, practically every state in the Union may have a share in the benefits to be derived from the building of this liner. In an article beginning on the following page we attempt to list some of the variety and quantity of equipment and materials necessary for the whole program, of which this ship is the first number and the largest individual item. Read this article and see what great and widespread benefit comes to industry from any large shipbuilding contract.



The New *Shipbuilding* and American

A Brief Summary of Some of the Benefits to Industry Involved in Building 95 Ships

A brief analysis of the replacement ships proposed by the U. S. Maritime Commission and an appraisement of the effect of this construction on the industry of the United States.

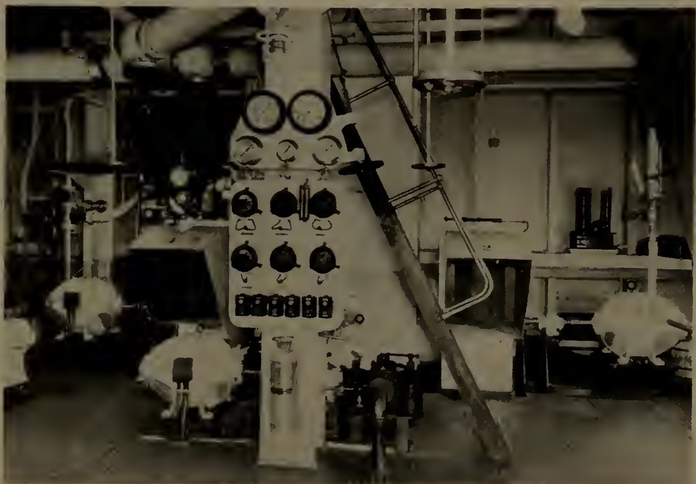
The principal objectives of the Merchant Marine Act of 1936 are "that the United States shall have a merchant marine (a) sufficient . . . to provide shipping service on all routes essential for maintaining the flow of its domestic and foreign waterborne commerce at all times; (b) capable of serving as a naval and military auxiliary in time of ware or national emergency; (c) owned and operated under the United States flag by citizens of the United States insofar as may be practicable; and (d) composed of the best equipped, safest and most suitable types of vessels, constructed in the United States and manned with a trained and efficient citizen personnel."

Pursuant to such policy the Act created the United States Maritime Commission, which is vested with very extensive powers; to grant ship operating and shipbuilding subsidies to American owned American flag vessels operating in the foreign trade of the United States; and to build vessels in American shipyards for its own account and charter these vessels to American citizens for operation in the foreign trade of the United States.

LIST I
Power Plants

400 boilers complete
1600 oil burners complete
120 flue gas analysis sets
200 force draft blowers
240 fuel oil transfer pumps
400 sets soot blowers
190 feed pumps
240 fuel oil transfer pumps
120 main propulsion turbines
120 reduction gear sets
120 throttle valves
120 control boards with gages
120 main condensers
120 main circulating pumps
120 main condensate pumps
120 ejectors with inter and after condensers
200 auxiliary generating sets
95 auxiliary condensers
95 auxiliary circulating pumps
95 auxiliary condensate pumps
120 lubricating oil purifiers
120 lubricating oil transfer pumps
95 carbon dioxide or steam fire extinguishing systems
120 fuel oil heating systems
120 feed water heating systems
400 general service pumps
400 ventilating blowers
1800 electric motors

And large quantities of many other items such as: Pipe, valves, insulation, packing, strainers, filters, steam traps, telegraphs, revolution counters, steam whistles, shafting, pillow blocks, stern tube fittings, engine room hoists, propellers, and non-skid floors and gratings.



One end of boiler room on modern American liner.

Program Industries

At left: Pilot house of modern American liner. On right: Engine room of modern American liner.

After considerable study of the needs of the trade routes involved the Maritime Commission has recently announced a five year ship replacement program involving 225 to 250 ships and an estimated cost of approximately $500,000,000. This program is intended to be the beginning of an orderly replacement of all obsolete vessels in the United States overseas merchant marine.

Congress has approved and appropriated funds for an initial unit of this program. This unit contemplates building 95 vessels in American shipyards during the next three years at an estimated cost of $256,440,000. In a recent statement Chairman Kennedy of the Maritime Commission announced the numbers and types of vessels as follows:

46 cargo vessels	$58,880,000
14 cargo vessels	$19,040,000
10 passenger and cargo	$40,000,000
10 passenger and cargo	$55,000,000
4 passenger and cargo	$40,000,000
1 special Manhattan type	$15,000,000
10 tankers	$28,520,000
Total 95 vessels	$256,440,000

The present proposal is that part of this fleet at $109,760,000 estimated cost, shall be built and financed under the ship subsidy clauses of Title V of the Merchant Marine Act. On this part of the program the private owners would be required to pay 25 per cent of the cost in cash during construction, and the Maritime Commission would pay the balance partly as an outright ship's subsidy, and partly as a loan to the shipowner.

The balance of this fleet at an estimated cost of $146,680,000 would be built under Title VII of the Merchant Marine Act, with the entire cost paid by and title to ships retained in the Maritime Commission, which body would charter these vessels to private American flag operators for foreign trade service.

The launching of a shipbuilding program on any such scale as is here proposed will, of course, be a stimulus to industry in the United States. It will give a large boost to employment. And these benefits will be very widespread. Just how much these factors involve and in what areas they operate can best be appraised by taking a rapid survey of the materials, machinery equipment and furnishings required for 95 vessels of the sizes and types included in this program.

● Labor Benefits

It is generally conceded that labor gets a larger proportion of the costs in shipbuilding than in any other in-

The latest American intermediate liner type.

LIST II
Deck Auxiliaries

1000 cargo winches
95 windlasses
300 capstans
260 lifeboat winches
95 steering gears
2000 ventilatng blowers
3500 electric motors
At least 25 smoke detecting systems

And large quantities of: Wire rope, Manila rope, teak decking, canvas paulins and tarpaulins, electric motor controls, electric wiring and conduit, and many other items.

dustry. Some analyses say 80 per cent of the cost of a finished ship goes to labor somewhere along the line from the iron ore ranges of Minnesota to the finished hull with all its machinery and fittings at a sea coast dock. Let's be conservative and call it 70 per cent. Then we have 180 million dollars for labor on these 95 ships. At an average of 80 cents an hour this would make 225,000,000 man hours, or, in round numbers, 35,000 men for three years.

● Steel

This program calls for some 500,000 tons of steel. Steel in ship plates and sheets, steel in angles, tees, channels, and I bars, steel forgings, steel castings, steel tubing, steel fittings. Alloy steel for engine parts, stainless steel for fittings and for decorative effects. Steel wire rope, steel valve bodies, steel lifeboats. Steel in every conceivable use and form will be produced for these jobs, will be poured, and rolled and forged, and fabricated, and welded by the mills and foundries of the nation.

● Power Plant

We do not have the particulars of the speed and power requirements of these 95 ships, but a rough approximation indicates a total capacity of the 95 power plants at 800,000 horsepower. This is based on the assumption of medium speed tankers and cargo carriers with an average of 6,000 horsepower, the Manhattan type special with 30,000 horsepower, four cargo and passenger liners with 20,000 horsepower each, 10 cargo and passenger liners with 12,000 horsepower each, and 10 cargo and passenger liners with 10,000 horsepower each.

Let us also assume that the 25 passenger ships will all be twin screw and that the 60 cargo ships and 10 tankers will all be single screw. Then if the power plants all follow recent American practice we will have power plant equipment to be provided substantially as in List I. Looking over this list even casually one is impressed with the broad field covered by these requirements and the wide range of their contribution to industry in the United States.

This same widespread coverage of industrial benefit is very noticeable when we analyze the requirements of the hull as a floating warehouse transporting cargo from port to port. List II sets forth the items required as deck auxiliaries on these vessels assuming that electric drive will be used exclusively.

In the service departments of modern ocean liners we find a great variety of equipment, fittings and fur-

Cargo and passenger motorship City of New York, one of the few first class motorships under the American flag.

LIST III
Service Departments

120 main refrigerating machines
200 automatic service refrigerators
200 galley ranges
40 electric bake ovens
40 grills
120 electric toasters
200 coffee urns
50 dishwashing machines
50 bread slicing machines
50 dough mixers
50 complete laundries
25 complete printing shops
5 complete stock exchange boards
4000 bathrooms or showers, and
8000 staterooms, for which the furnishing and equipment, together with that for public rooms and for crews' quarters, would include:
20,000 wash basins
18,000 beds
12,000 berths
8,000 bath mats
100,000 bath towels
200,000 hand towels
60,000 blankets
30,000 spreads
120,000 sheets
48,000 pillows
30,000 mattresses
12,000 deck chairs
96,000 pillow slips
1,000,000 pieces tableware
10,000 tablecloths
100,000 napkins
14,000 rugs
70,000 chairs

And numerous other articles, including: Great quantities of pictures and engravings, dressers, lockers, port lights and windows; enormous quantities of hardware, such as door and window locks, door knobs and stops, and towel racks; great tonnages of special material, such as tiling, linoleum, paint, and deck compositions.

nishings in large quantities. These 95 vessels will be the floating homes for a population of approximately 30,000 persons, all of whom demand reasonably luxurious comfort and sanitation in sleeping and recreational quarters, and three or more square meals each day for each person, served in the most modern fashion. In brief, the total equipment and outfitting of the service departments of these ships represents the equivalent of the household equipment of a modern American city of 30,000 population. An exact list of this equipment is obviously impossible of compilation without full and complete detailed particulars of each ship and of the service in which she is to be operated. List III is our approximation based on former vessels of similar cost figures. This list might be tremendously extended by going into more minute detail.

The new rules for safety of life at sea formulated by the Bureau of Marine Inspection and Navigation of the U. S. Department of Commerce specify a much larger and more expensive list of equipment for safety and navigation than did the former rules. Our list IV is an attempt to enumerate the more prominent items in such equipment as it will be required on these 95 vessels.

Over a million gallons of paint will be required to properly coat these ships. This paint may have a total weight of over 8,000 tons. If it is all of lead base it will weigh much more. If it is of zinc base 8,000 tons would be about right. If it is all aluminum base paint the weight would be less than 3,000 tons.

LIST IV

Navigation, Health and Safety Equipment

150 magnetic compasses
95 gyro compass systems
95 gyro pilots
95 course recorders
120 patent logs
95 engine revolution direction indicators
95 radio direction finders
95 radio transmitters
95 radio receivers
95 radio distribution systems
95 echo sounding instruments
120 clear vision screens
25 emergency radio loud speaking systems
600 lifeboats fully equipped
100 lifeboat power plants
100 lifeboat radio sets
30,000 life preservers
95 life line guns
600 life buoys
250 power driven watertight doors with remote control
95 diesel electric emergency generating sets
400 storage batteries of various capacity
95 sets complete running lights and running light control boards
95 sets ship's hospital or sick bay equipment
25 sets complete equipment for ship's gymnasiums
580 anchors
38,500 fathoms stud link chain cable
200 searchlights
25 complete automatic fire alarm systems.
25 complete automatic fire extinguishing systems
800 manually operated fire extinguishers
250 reels with fire hose
250 fire hose nozzles

And large quantities of numerous other items, such as special buoyant apparatus, maps, charts, flags, signal codes, books for ship's libraries, medicine and surgical supplies.

In the construction of these vessels, while a comparatively small amount of wood will actually be built into the hulls or used in the furnishings, nevertheless a very large quantity of lumber and wood products will be used by the shipyards, both in preparation for and as auxiliary to the construction work—templates, models, piling for shipways foundation and for outfitting docks, planking for shipways and outfitting dock floors, heavy timbers for shoring, for sliding and stationary launching ways, for launching cradles, and for scaffolding.

Already, due to the commercial tanker building program, the naval construction work, and this impending Maritime Commission program, the shipbuilders of America have suddenly emerged as one of the nation's most important markets for the machine tool industry.

On the Pacific Coast alone the past 12 months has witnessed a shipyard retooling and shop improvement movement that has been responsible for an aggregate expenditure of more than two million dollars. During the past two years many times that figure has been expended in betterment to shipyards on the Atlantic Coast.

Every indication points to a boom in American shipbuilding. The actual increase in construction during the past two years has been approximately 250 per cent. When the Maritime Commission releases its subsidized program there will be another increase of over 200 per cent. Pacific Coast yards are ready for their share of this business, and should get from 25 to 40 per cent of the tonnage.

Some Questions

An Experienced Pacific Ocean Operator Endeavors to Cover Some Items Included in the Prospectus for the Maritime Commission Economic Survey of Shipping

By E. E. Johnson

● **Foreign Trade**

1. Are ships subject to our own control necessary to insure continued delivery of our goods, both exports and imports?

The United States may be likened unto an international department store. It deals in the products of the soil, the mine, the forests, and in manufactured goods. The United States, unlike many other nations, is both an agricultural and manufacturing nation, and, as such, depends upon imports of raw products to a very much greater extent than is popularly known or considered. Thus, during the World War, it required over 1,100 ocean-going ships to supply our nation with essential raw products. We had few ships. The allies needed our goods and supplied the needed ships. They were thus able to dictate their policy.

About ten per cent of our total population depends upon foreign trade and shipping for its gainful employment, and our exports of manufactured goods serve to keep production and employment at a steady pace during slack domestic periods.

Without our own delivery system we are not free to determine for ourselves what we are to sell, what markets to develop, or the mechanics of insurance, finances, and transportation. Before the advent of our war-built fleet our foreign trade was mainly controlled by a few foreign brokers. They specified the financial transaction, the insurance, and the mode of transportation. They purchased what they wanted, not what we would like to sell. The goods sold were mainly raw products, which served to denude our national resources and reduce employment of American workmen. By manipulation of ship services, freight rates, and other conditions, large orders for our goods were deflected from American to foreign products, where we paid millions of dollars in service charges.

The war-built fleet, slow and unsuited as it was, provided a fluid transportation medium, and our merchants sent their own sales force abroad, American banks opened foreign branches, and American steamship agents provided a medium of favorable development. Thus exports of manufactured goods rose from 46.7 per cent in 1914 to 61.4 per cen in 1929.

The value of American ships to th American grown producer, exporter and the public at large is rapidly understood when the fact is known tha some 80 per cent of our exports are carried to market in ships.

Yes, assuredly, American ships in direct overseas trade routes are and will be a great force in insuring continued and speedy delivery of goods sold and purchased abroad. These ships are not subject to sudden withdrawal by emergencies beyond our control, or the abandonment of essential route offers temporary tramp opportunities at greater earnings.

American ship services must necessarily be on fixed routes, with specially adapted ships with frequent and dependable sailings by fast, comfortable, and safe vessels, American built, owned, and manned.

2. Do American vessels protect our traders against exorbitant rates? Should American operators enter conferences?

Before the World War the transatlantic ocean freight rate on wheat averaged 7.7 cents per bushel. Lack of ships and war exigencies drove this up to 136.7 cents per bushel in 1918, or an advance of 1,700 per cent. By 1923 American ships had forced the rate down to 8.1 cents per bushel. Cotton fared likewise. The ocean rate was 41 cents per one hundred pounds. The 1918 rate climbed to $6.25, or 1,450 per cent. By 1922 the American ships had hammered this down to 49 cents per one hundred pounds.

Without American ships the American exporter is at the mercy of foreign ships. Foreign lines combine, fix the freight rates, and have in the past definitely swung business

to the American Shipowner by the *Maritime Commission*

to their nationals by manipulating freight rates service and using bill of lading information.

Wherever American ships have started competition and protective services there has been a corresponding benefit to the American exporter, importer, and the public. Ocean freight rates and passenger fares have been reduced to proper proportions. This was true of the ships built as the result of the 1848 mail contracts, Collins Lines, The Ocean Steam Navigation Company, and, in 1864, the United States and Brazil Steamship Company. It is equally true today.

The ship conference method of setting ocean freight rates and passenger fares is of comparatively modern innovation and, so far, critics of ship conferences have failed to suggest a better plan. A careful study reveals that every effort to fix ocean freight rates by law has ended in failure. To legislate rate structures in international trade routes will undoubtedly prove both inelastic and ineffective. American shippers cannot compete with foreign shippers of similar goods to the same markets if faced with inflexible rates and rules established by a government agency such as, say, the Interstate Commerce Commission.

Their methods of procedure are necessarily slow and cumbersome. By the time corrective measures are taken the foreign shipper has secured the business and future sales are jeopardized.

When steamship conferences are properly run and carefully regulated as at present, they have proved of great advantage to both the shipowner and the shipping public. To the shipowner it means reasonable earnings over long periods, which permits long-range planning to pro-

Short Chronology of American Shipping

Period 1789-1815

During which Congress passed discriminatory customs duties and port dues favoring American ships in foreign trade, until American shipping progressed to a point of self-sufficiency.

Period 1815-1828

Congress vacillated as between protection to American shipping and international reciprocity. In 1817, however, Congress passed the Coastwise Act, which, effectively and consistently enforced, kept the American flag at the taffrail on a nucleus of ships suitable for transports in an emergency.

1828

International Reciprocity Act passed, from which time can be traced the steady decline of American shipping in foreign trade.

1828-1845

Development of the famous American Packet and Clipper ships, a glorious era of American accomplishments at sea. Sailing ships, however, doomed to extinction by the advent of the steel ships, steam machinery, and the screw propeller.

1845-1858

Congress passed the first Mail Contracts, under which American built, owned and operated ships were produced for sea service. Act scuttled in 1858 for political reasons and our overseas ships sold to competing nations.

1858-1917

Period of American overseas shipping decline to practical non-existence.

Twice the mail contract system was revived, but these revivals were too timid in scope to accomplish results, and the inter-car development after the Civil War found the youth and capital of the land going Westward.

1918-1928

Period of forced emergency war building program of ships designed for war service without regard to economic future use. Some 1300 of these slow ships put into overseas service, increasing our yearly average foreign trade from three billion dollars for the 15 years before the World War to eight billion dollars after the World War, but being rapidly replaced by faster and more modern and more economical foreign ships.

1928-1936

The 1928 Act awarded mail contracts based upon the size and speed of ships, without any direct reference to the varying competition features in different foreign trades.

The 1920 and 1928 Acts proposed to undertake shipbuilding programs along rational lines. Under the 1920 Act the mail contract subsidy failed to recognize competition operating costs. Under the 1928 Act the great war depression served to slow down an adequate building program. Then the tactically forceful investigations of ocean and air mail contracts completely stopped ship construction loans.

1936

Another Merchant Marine Act passed; its object is to build up an American Merchant Marine along scientific lines. It is, however, so restrictive that private capital may hesitate greatly in supporting a national program of the required magnitude.

vide maximum service, faster ships and greater frequency of sailings. To the shipping public it means stability in freight rates and ability to quote C. I. F. prices months in advance, plus the knowledge that they have positive parity with other shippers, be they shippers of large or small tonnage, and they further know that the conference has studied and furnished them with competitive status with similar goods produced in a foreign country for the same overseas market.

Decidedly, American ship operators in overseas services should join ship conferences. Where American shippers are involved, they should and do champion the cause of the American shipper and goods for fair rates.

Where recalcitrant foreign ship conferences try to exclude American ship operators in regular trades the present law concerned must be effectively invoked. Where wildcat and unscrupulous operators enter a trade and use the conference rate structure as an umbrella, and conference rates are undercut by specified percentages, the law must be given effective force quickly. True, we have seen and felt the effect of such cutthroat competition within the past few years, which broke up conferences on all coasts, created confusion, instability, loss of business, and bankruptcy.

3. Do American vessels in a trade tend to improve the service given to our exporters and importers?

During the Boer War, the World War, the British coal strike, the Japanese earthquake—in fact, during any unusual period of activity in world overseas shipping even under present conditions — foreign ships have withdrawn and are withdrawing from American essential overseas trade routes to engage in emergency war service or other more profitable business. A good case in point: The British Reardon Smith Line entered the Pacific Coast-Europe service during the world depression. A few months ago they withdrew from this essential American trade route to engage in tramping, where earnings are temporarily higher. Our shippers were left with cargo which had been firmly booked and ship space was scarce.

By reasons of subsidy commitments, ships specially built for the trades, and the fact that American ships cannot compete as tramp ships, the American ships will continue to render regular, frequent, fast, and dependable service so long as competitive conditions will permit them to operate. Under contract with the government they are required to operate win, draw, or lose.

American shipowners, American agents abroad, and the ships personnel have their own interest at heart, which coincides with the interest of the American importers, exporters, farmers, manufacturers, and the general public.

4. Does domestic-flag competition minimize the chance of discrimination against our goods by foreign vessels?

In the past there have been numerous known instances of discriminations against American goods.

Foreign ships, owners, agents, and governments must and do have their own interests at heart.

By manipulations of freight rates, insurance premiums, trade preferences, and other schemes, any large business can be thrown to its own nationals.

It has been and is being done. It is our own fault if we place ourselves in a handicapped position by trusting most of or our entire transportation problems to those who can do it cheapest. In the long run, it is the most expensive luxury we can afford. It is also known that, where American ships have utilized foreign agents, damages to cargo have been trumped up that were slight or nonexistent.

Where there are American services adequate to protect that trade, and where American resident agents are employed, these discriminations do not occur.

5. Does the merchant marine in and of itself tend to develop new markets? In other words, does trade follow the flag?

Yes, trade does follow the flag. For the fifteen years before the World War, when some 17 American ships carried only about five per cent of our overseas commerce, our average foreign trade amounted to about three billion dollars per annum. The five war years averaged about seven and one-half billion. But mark this: We built about 2600 ships and hit the deck with some 1350 of these ships in most all of the American direct world trade routes.

American ships were fought by steamship combines, conferences, port authorities, insurance combines, Government regulations, and national preferences, yet for the fifteen years after the World War, including the four worst world-wide depression years business has ever encountered, our average foreign trade amounted to eight billion per year.

United States Shipping Board statistics show increases on each and every trade route, some up to nearly 600 per cent, particularly with countries lacking maritime facilities. This unmistakably shows that the trade follows the flag. Japan, with her new motorized fleet, is opening trade channels heretofore denied her.

6. Does the exportation of ship services (which we produce at a disadvantage) reduce our exports of other commodities (which we can produce at a profit)?

The invisible exports of foreign maritime nations consist of ship, finance, and insurance services, plus remittances from emigrants and investment earnings.

While American exports and imports are only second to those of Great Britain and we are ahead of any nation in the world in the traveling public, we doubt greatly whether American ship carryings will so reduce those earnings of foreign maritime nations as to seriously cripple their purchasing power; further, these nations are also manufacturing nations and only such manufactured goods as are made cheaper and better in America can be exported by us to those nations.

Our carryings during the very top of our seafaring splurge after the World War only amounted to about 45 per cent of our exported goods and imported products. Today it is only about one-third, while the other maritime nations carry from sixty to eighty per cent and more of their own overseas commerce, plus at least two-thirds of our commerce, plus other world trade. Further, the real increase in our business has been with countries lacking sea transportation and manufacturing facilities. The maritime manufacturing nations will purchase their food and raw products where they can secure the

cheapest and best goods in sufficient quantities.

Our only security in world trade, no matter how much it costs, lies in sufficient ships of modern and economic design to carry about fifty per cent of our own goods in both directions, serving direct routes with a frequency required to keep what we have and to meet future demands.

● National Defense

1. What does the Navy require in the way of auxiliary tonnage?

How much of this tonnage is now available in protected trades?

2. What does the Army require in the way of troop and supply ships?

3. What is the relationship between merchant shipping and the air service?

We do not presume to answer for the Navy and the Army as to their requirements during any national emergency. There have been statements that the British Navy required some three thousand ocean-going ships to serve it during the World War.

The British magazine Fairplay has stated that if a similar world conflict took place today there would again be a shortage of ships similar to that of 1914 and 1917.

We should be chary of any over-emphasis of the need of purely cargo carriers in overseas trade routes.

America cannot and should not compete in purely tramp service, even under temporarily profitable conditions. Our duty is to furnish suitable vessels in direct trade routes that require cargo liners. Here the Japanese and the Europeans have set the pace with 16 to 18 and even 20 knot vessels of about 9,000 tons deadweight. But in most of our trade routes we require combination freight and passenger ships of good speed, up-to-date refinements, modern safety appliances, and able to attract the American traveling public. We should not lose sight of the fact that the intercoastal and coastwise trades have numerous ships suitable as supply ships in time of national stress.

4. Is merchant shipping necessary to preserve the shipyards and the art of building so that we will have them available in an emergency?

During the after-the-war slump, Great Britain and Ireland formulated the Trade Facilities Acts, whereby loans up to 100 per cent were made at low interest to encourage both British and foreign shipowners to build ships. Germany, Italy, Japan and others furnished government aid and set up the scrap and built bounties.

They all realized that technicians and skilled labor cannot be trained overnight, that they are of vital necessity in times of stress, and thus prevented the drifting of these highly trained men into other trades. Meanwhile, production in American shipyards fell to the lowest point in modern history. To keep a nucleus of skilled labor, the shipyards built railroad cars and bridge material.

Fortunately, we are blessed with so much allied construction that skilled labor may readily be shifted to shipbuilding, otherwise we might face a problem of national importance. The greatest danger undoubtedly lies in possible loss of highly trained technicians.

Steady replacements of our merchant shipping, fed by a constructive and a consistent program of nationally planned overseas competitive service, will do much to remedy unemployment and keep our skilled workers and technicians for our regular as well as for any emergency work.

5. How important is commercial shipping as a source of trained men, both ashore and afloat?

For centuries Great Britain and France have pursued a steady policy of encouraging seafarers and allied workers ashore to remain in service so that in time of national emergency the Navy may call upon a trained personnel.

England encouraged her fisheries, and in 1859 started paying the men on passenger ships, suitable for cruisers, a naval reserve pay, which was extended to officers in 1861. During the World War some 5,000 officers and 55,000 men were naval reserve. During 1923 there were some fifty divisions of 100 men each enrolled as British Naval Reserve.

France formed her Inscription Maritime in 1863, whereby men of military age could serve in the army or join the merchant marine seamen, all subject to naval duties in time of national emergency.

During the World War, in some cases, men and officers had to be taken from the American Navy to man American ships.

Ships without men are just so much material afloat.

America needs to form a Naval Reserve from her seafarers and from qualified men ashore.

We have Naval Reserve status for ships' officers, but there are no appropriations for Naval Reserve pay. The crews have no Naval Reserve status at all. They should be paid according to their rank and service. Great Britain spends about three million dollars per annum for naval reserve pay and equipment. This is paramount for a successful American Merchant Marine and for our safety as a commercial and maritime nation.

● Capital

1. How much money has been invested in our present foreign-going fleet, by private investors and by the Government?

This is a subject for national survey.

2. What has been and is at present the earning record of ship lines? The reserves?

Since 1929 the entire world has been beset with difficulties. Shipping was particularly badly hit. American foreign trade, probably as well if not better off than any except that of Japan, by 1933 had fallen off by more than sixty per cent in value and by more than fifty per cent in volume. Foreign nations built new and very economic ships while America stopped building entirely for overseas trade.

But even with low cost and highly economic ships foreign owners could not make a profitable go of it and their respective governments had to go to the rescue. British, French, German, Italian, and Japanese governments devised various means to succor their ailing ship lines and to protect their vital shipping industries.

In America conditions were even worse. Foreign ship lines flocked into American overseas services, disrupted ship rate conferences, cut freight rates and passenger fares to below American costs, and forced

(Page 66, please)

A Super Tuna Clipper with Welded Steel Hull

The new super-tuna purse seine boat Paramount, recently delivered to the French Sardine Company by the Lake Washington Shipyards of Houghton, Washington, is in several respects "first" among the fishing fleet of America, and in at least one characteristic the leader among the fishing boats of the world.

She is the first fishboat on the Pacific Coast to be classed by the American Bureau of Shipping.

She is the highest cost fishboat to date built on the Pacific Coast.

She has the largest capacity for carrying fish in brine among Pacific Coast fishboats.

She is the largest purse seine boat in the world.

Immediately following her acceptance by the French Sardine Company Paramount was sold to Frank Mosich, Bernard Carr, and Associates, who will operate her in tuna fishing out of San Pedro.

Paramount is 121 feet long by 30 feet beam, and has a capacity in cooled brine tanks for 330 tons net weight of fish.

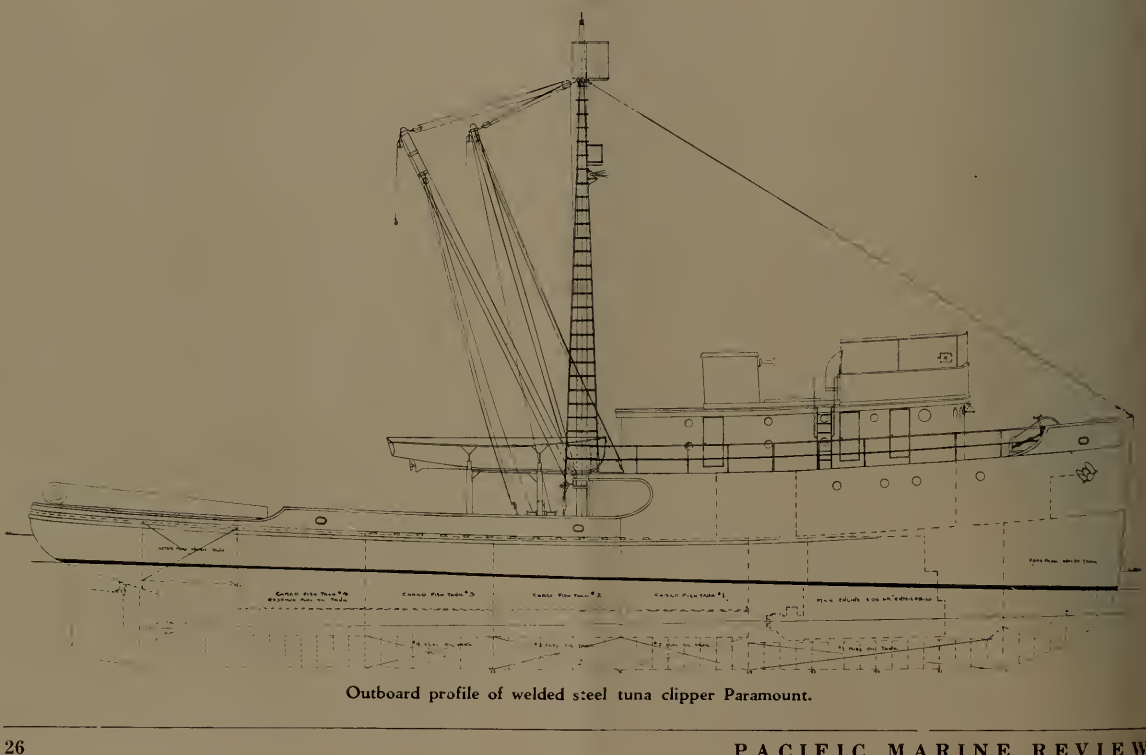
She was designed by Nickum and Sons, naval architects of Seattle, in collaboration with the operating owners, Mosich and Carr.

The hull is an all welded steel job with many unusual features. As is usual in this type of craft her engine room is well forward, leaving the deck aft clear for fishing operations and the under deck space aft clear for fish holds.

In this under deck space eight brine tanks are arranged, four on each side of the shaft tunnel, which on this craft is the full height of the hold and extends from the water tight bulkhead aft of the engine room to the after peak. In this tunnel are carried all the pipes, wiring, and steering gear controls.

Water and oil tight double bottom tanks extend from tail shaft stuffing box to fore peak bulkhead and provide stowage for 20,000 gallons of diesel fuel oil. Fuel may be carried also in two of the brine tanks, giving 25,000 gallons added capacity. Any of this additional fuel not needed may be sold or given to other boats on the fishing grounds or it may be dumped. A tank in the engine room provides stowage for 1600 gallons lubricating oil.

The brine tanks are insulated with 5 inch slab cork laid in hot tar and



Outboard profile of welded steel tuna clipper Paramount.

the steel work of the hull in way of these tanks was sand blasted to the bright steel, thoroughly painted with an anti-corrosive paint next the metal and with a covering coat over that. All steel joints in the hull are welded joints.

Machinery Installation

The propulsion unit is a six cylinder directly reversible, direct connected Enterprise Diesel delivering 600 shaft horsepower at 200 r.p.m. This engine was designed and built by the Enterprise Diesel Engine Company of San Francisco. It is a very neat job and performs very satisfactorily over a wide range of loads. The Bosch fuel injection system is used. A Kingsbury thrust bearing is built into the frame of the engine.

This engine is directly connected through its thrust bearing to the line shaft, which is composed of 3 lengths of solid forged 6½ inch diameter steel with integral forged couplings at each end of each length. The tail shaft is 7 inches diameter with a brass liner ¾ inch thick, and carries a Lambie designed phosphor bronze propeller 86 inches in diameter.

The engine room is completely protected from fire by a CO-Two fire extinguishing system.

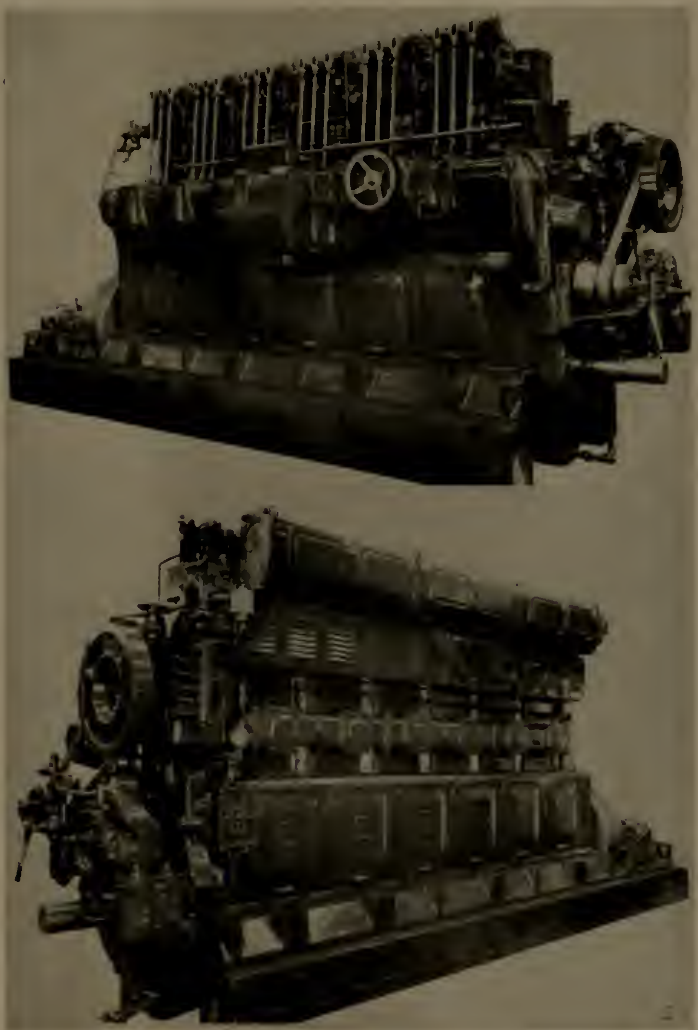
This power plant drives the hull at 11 knots loaded and 12 knots light, and with her fuel tanks full the Paramount will have a cruising radius of approximately 15,000 miles.

Two air tanks 25 inches in diameter by 80 inches in length store starting and maneuvering air at 250 pounds pressure. These take air from a 35 cubic foot capacity Gardiner 2-stage compressor driven by Vee belt off the main engine. A standby electrically driven automatically controlled compressor takes up the work of air supply whenever the pressure drops below 250 pounds. For initial starting air and for lighting in port a 5 horsepower Witte diesel is installed clutch connected to a small compressor and to a 2 K.W. generator.

Two Enterprise three cylinder 85 shaft horsepower diesel engines each directly connected to a Westinghouse 50 K.W. 110 volt, direct current generator supply electric energy for auxiliary machinery and for lighting.

Two electrically operated Baker ice machines, each of 21½ tons capacity, serve the cooling coils of the brine tanks. The brine is kept at a temperature of 28½ degrees Fahrenheit, and the ice machines are frequently called on to work overtime, since the tanks are usually opened up, skimmed off and flushed every 24 hours. One Baker ice machine of 3 tons capacity takes care of the refrigerated boxes for ship's stores, of which there are three, one for meat, one for vegetables, and one service box in the galley.

There are two complete systems of refrigeration with the two main Baker ice machines. These systems are cross connected so that both machines may be concentrated on any one tank or any part of the total tankage. The procedure on filling any one tank with fish is to put both ice machines to work on that tank and bring it down as rapidly as possible to 28½ degrees. When fish and brine have reached that point one machine is cut out and the other easily keeps the brine and fish at that temperature. Straight sea water



Starboard and port sides of the 6 cylinder 600 B.H.P. Enterprise diesel installed in Paramount.

Ghostlike against a background of Washington fog the trim white hull of the Paramount slips through the quiet waters of Lake Washington.

is used for brine. With all tanks full of fish and sea water and brought down to 28½ deg. Fahrenheit, one ice machine will maintain the temperature in any ordinary weather conditions encountered between Los Angeles harbor and the northern South America coast.

Two Fairbanks-Morse 5 inch centrifugal pumps each directly connected to a Fairbanks-Morse motor take care of all the general service requirements.

A Markey Machinery Co. (Cunningham) cargo winch driven by a 40 H.P. motor takes care of the boom handling the nets. A windlass of the same make handles the anchors.

This winch and windlass equipment is the largest of its type ever installed on a Pacific Coast fishing vessel. The winch frame is of fabricated steel. A special magnetic variable speed regulator controls the 40 horsepower electric driving motor. This regulator has a range of 3 to 1 in the motor speed. From the motor shaft the drive is taken through an enclosed silent chain transmission to a fore and aft shaft carried in roller bearing pillow blocks. From this shaft to the winch drum shaft the drive is carried by a multiple strand steel roller chain. All bearings on the winch are bronze bushed and served with pressure lubrication.

On tests this winch, running on low speed, easily parted a new 6 inch Manila hawser.

The Markey windlass is of the single drum worm gear type, with fabricated steel frame. It is driven through a vertical shaft carrying a cut steel worm by enclosed silent chain from a 7½ horsepower Westinghouse motor located below the deck. The steel worm engages a cut bronze worm gear, both running in an oil bath. The port end of the worm wheel shaft carries a drum fitted with Markey positive key drive. This drum carries 200 fathoms of ⅞ inch wire and one shot of chain. The starboard end of the worm wheel shaft carries a wildcat for 15/16 inch stud link anchor chain. A machined gypsey is fitted at each side for independent operation. A reversing drum controller for the motor is operated at the windlass. This arrangement is very compact, and especially suited to craft like fishboats with limited space on forecastle decks.

● Accommodations

There are seven rooms for crew accommodation. Five of these rooms have 2 bunks each, one room has 4 bunks, and one room is a spare. There are 2 shower baths, 2 toilets, 2 wash basins. A crew of 14 will be carried, including engineer and navigator.

A photo-electric pilot is installed in the chart house, and the ship is equipped with a wireless outfit, and a telephone system of the sound actuated type with stations in the engine room, the crow's nest, the after bulkhead of the galley, and the flying bridge.

The great interest in this ship for the Pacific Coast fishing business lies in the trend away from wood hulls to steel. The cost of Paramount is $200,000. A hull of the same size in wood, with similar equipment, would cost $150,000 plus. Insurance rates on the steel hull will be less than half those on the wooden hull. Maintenance costs for the steel hull will be much lower. On these two items alone the operating owners of Paramount figure they will write off the extra cost in less than two years.

On top of these advantages this steel hull will have approximately 30 per cent greater fish carrying capacity than a wooden hull of the same dimensions.

Taking all these factors into consideration the Pacific Coast fishing industry will be watching the performance of Paramount with great interest.

Fortune *at Sea*

"To Be or Not to Be: That is the Question! Whether it is Better in the Mind to Suffer the Slings and Arrows of Outrageous Fortune; Or to Take Arms Against a Sea of Troubles, And by Opposing End Them."

By R. J. Alexander

Says the Fortune Magazine for September, 1937:

"The United States merchant marine is easier to malign than to define."

Unfortunately, this has been the case since legislation imposed the decline of American overseas shipping. International reciprocity laws supplanted laws favoring American ships, and in 1855 the slavery feud set off the spark that killed the first American try at the British invented mail contract system to encourage regular steamship service on overseas essential mail and trade routes and to develop the naval reserve.

From then on the proponents of American overseas shipping, in spite of the declaration of both the main political parties having a merchant marine plank, have clashed with opponents unwilling to meet or recognize the economic factors involved in overseas competition. The march inland after the Civil War also eased the urge to utilize "nature's great medium of communication," "God's gift to man"—the sea—and transformed a great sea power into landlubbers with a very high inferiority complex as regards American ships on the seven seas.

Every president of the United States has advocated an adequate merchant marine. Far-seeing statesmen and cabinet members have done likewise. And in 1864 and 1891 we tried mail contracts again, but with such temerity and utter disregard for economic disabilities that little or no headway was made.

After each try at the mail contract system there has been an upheaval in Congress, culminating in the investigations of the Black committee. In a small measure, we have tried to emulate successful British merchant marine acts. Today the British merchant marine is surrounded by protective safety measures to avoid deception pitfalls. For instance, no legislation proposed can be acted upon by the British Parliament without first being scrutinized by experienced members of the British Board of Trade. But it has not always been so. Says Fairplay, June 4, 1936:

"The views of the Board of Trade on the subject of shipowners are, of course, quite different from what they were in 1883, when the Fairplay was founded. In those days the Board of Trade had a habit of accusing shipowners of doing all kinds of wicked things. Partly as a result of that, the then president of the Board of Trade, Mr. Joseph Chamberlain, unfairly attacked shipowners. As no newspaper was available for the defense of the industry Fairplay was founded and convinced Mr. Chamberlain and the Board of Trade that shipowners were not the scoundrels they were presumed to be."

Here in America we have no newspaper or a Fairplay to defend a complicated industry. Reason, clear thinking, and a willingness to understand real problems on a subject so national as the overseas steamship industry is relegated to the region of the damned and sprightly reading is provided at the expense of economic equality and advantage and a blow to national pride.

We subsidize railroads, rivers and harbors, airplanes, utilities, mails, and what not. We erect tariff walls and thereby subsidize farmers, industries, and labor. We extend tremendous loans at low interest to all kinds of enterprises. But where the most interesting, the most highly competitive, and the most difficult and economically desirable industry is concerned, we make a mountain out of a molehill, class it with the "peanut," "pop," and "floral" business, and suggest that we revert to the same helpless state we found ourselves at the beginning of the World War.

We spent hundreds of millions on our splendid Navy. Yet naval authorities state that without an adequate merchant marine support the Navy is only sixty per cent effective. Says Captain Howard G. Copeland, U.S.N.R., Officer in Chief of Naval Operations, Policy Section:

"Any question that affects the Naval Reserve, any question that affects the merchant marine, affects the Navy. In time of war, the most useful, the most important, the most significant component part, the most significant factor of the whole Naval Reserve question at the present minute, and at any other time, is the merchant marine."

Thus speaks the Navy. And, through the person of Eugene P. Thomas, president, National Foreign Trade Council, business declares:

"No country is economically secure which is forced to depend upon foreign shipping. As a prime factor making for the stabilization and advancement of our foreign trade, an adequate and efficient shipping service is indispensable."

Then the analytical economist, in the words of H. N. Lawrie, reasons:

"The producers of commodities, the surplus production of which must be exported, and the consumers of commodities which must be imported because of insufficient domestic production, constitute interests of far greater importance to the nation than the shipping industry itself.

"The expense of developing a strong American merchant marine, however great, would be returned directly many times to the people of this country in lower freight rates. Furthermore, the gains made in foreign trade through ability to make timely deliveries at rates which will make possible sales by our producers and manufacturers in competition with foreign producers and manufacturers should result in indirect profits still larger than the profits from lower rates."

As regards foreign trade, Mr. Francis B. Sayre, Assistant Secretary of State, paints this picture:

"The cutting off of our foreign trade means starvation wages and growing unemployment for home industries. It means city dwellers walking the streets unable to find work. It means farmers worrying how to pay their bills and prevent mortgage foreclosures, unable to buy the manufactured goods they need and want . . . . more than half of our cotton planters, two-fifths of our leaf tobacco growers, almost half of our dried fruit producers, and a very substantial portion of our rice growers, our corn-belt farmers, and our manufacturers, must be reduced to idleness."

The research professor is represented by Professor Eliot Grinnell Mears, Stanford University.

"Nothing is so international as a vessel, for, unlike the manufacturer or banker, who can transact business by radio, telephone, or mail in his home office, the ocean carrier makes the actual trip and solicits foreign business on the ground.

"Over four-fifths of the United States' imports and exports enter and leave the country by vessel.

"As long as the United States adheres to her policies of protecting shipyards and maintaining a high standard of seamen's wages and conditions, then some kind of substantial subsidy is needed to keep the merchant marine on the long sea trades."

But what does the farmer have to say? Here he is represented by the American Farm Bureau Federation, Chicago, speaking for 1,250,000 farm families:

"Improved farm practices, labor saving machinery, and scientific soil fertilization have brought production of farm crops to a point beyond domestic consumption. The American farmer must look elsewhere for a market for his products in the raw state or finished product. A substantial expansion of foreign trade is essential to progress and prosperity.

"To establish and make stable an enlarged foreign market, we must have a United States merchant marine adequate to provide transportation for a substantial part of American production under all changing conditions of world trade, and American shippers must make adequate use of American ships.

"A study of the situation emphasizes that American vessels are necessary to establish and maintain foreign trade. Particularly is this true with farm commodities which are in competition with products of foreign countries. Formerly it was mainly a matter of transportation. Now it is a matter of selling our crops against competition of other countries. To do this the element of personal contact is necessary. No other nation can or will perform that service for us. Experience has proven that foreign trade follows the flag."

Says the Secretary of Agriculture, Henry A. Wallace:

"Yes, the seaboard cities which line our Atlantic and Pacific coasts . . . . have an enormous interest in the farmers when they go down to the sea in ships."

And, when they are not looking for breezy news, the newspaper men are represented by Mr. James Edmund Duffy:

"The United States has the same rights and obligations in maintaining a merchant marine as the other nations. How we do this should be our own affair; but we stand before a barrage of criticism, which leads the uninformed to believe the United States should not have a Government supported merchant fleet.

"Destroy the merchant marine and you not only give away the richest trade prize in the world to foreign interests, but you take away what military tacticians say represent 40 per cent of the effective strength of the Navy."

Mr. Sayre has pointed out the importance of foreign trade to growers. Mr. Lacurie states that the grain growers are ordinarily dependent upon foreign trade to market about fifty per cent of their products. And Secretary Roper reports that for the depression year 1933 we exported the following percentages of the items enumerated:

Automobiles	11%
Power-driven metal-working machinery	23%
Office appliances	27%
Leaf tobacco	34%
Aircraft engines and parts	37%
Printing and bookbinding machinery	39%
Prunes	48%
Raw cotton	65%
Gum rosin	71%

So that, while our total exports may only be ten per cent of our total business, just these few out of thousands of items show that our exports permit useful employment and lower costs on locally distributed goods by reason of full time production and greater spread of overhead.

To aver, as so many do, that America is self-sufficient and independent of imports is utter rot, unless we wish to revert to conditions of pioneering and the dark ages. Without tungsten for lamps we would have no efficient electric lights until a satisfactory substitute could be developed. Without tungsten, ferromanganese and chromium our steel industries would suffer disastrously. What about rubber for our autos, our airplanes, our army and navy, and our hospitals and the medical profession? Tin for our immense canning industry? Jute, burlap, fiber, and sisal for our farmers? Antimony for our glass industry? And what about the millions of tons of nickel, copper, ores, kainit, potash, manganese salts, guano, nitrates, ve-

getable oils, corundum, plumbago, hardwoods, dyewoods, hides, henequen, and raw wool that we need and import?

We import the following one hundred per cent: Coffee, tea, rubber, raw silk, copra, camphor, pepper, dates, coconuts, cocoa beans, palm oil, olive oil, quebracho, bananas, licorice root, and fibers. We import more than half of our needs in raw wool, sugar, casein, figs, nuts, and cocoanut oil. In fact, America imports and uses about one-half of the more important raw materials produced everywhere.

Just a short twenty years ago we were at war. A list of the American transports utilized to ship our American troops across to France would wring an agonized "Ach" out of any patriotic German. Yet, with all of our own and the twenty or more of the fine German transatlantic liners sequestered, we had to depend upon the British to carry more than one million American soldiers over the bid pond, paid them about one hundred million dollars to do it, while the Allies used this transportation weapon in trying to bludgeon General Pershing, our staff, and our administration into assigning American troops as replacements for the British and French, under their flags and direction, instead of operating as an American unit. The British carried more than one million American soldiers, the seized German and Dutch ships about six hundred thousand, and our native American, naval as well as privately owned, transports were only able to lift less than three hundred and fifty thousand men.

The Fortune Magazine concludes that American shipping "does not take naturally to foreign trade," and that "The sounder policy, perhaps, would be to rest content with building up the coastwise service by such subsidization as it might need."

Those are the arguments that the British and other maritime nations have constantly used. Said Sir Frederick Lewis:

"Americans are not seafarers; we are, and should carry America's trade, as we have in the past."

The glorious days of the Clipper ships, and later accomplishments belie these statements. And as to rights of trade, we have the observation of the student, author, and former United States Commissioner of Navigation, W. W. Bates:

"The power of foreign ship competition in our foreign trade is a privilege we extend to foreign nations and not a right. If self-interest dictate the reserving of all or part of this carrying trade to ourselves, there is no one that can with justice say us nay."

Those who have been in the fight must chuckle with delight at the suggestion of subsidizing the coastwise lines. They can see the readiness with which the railroads will stand aside in polite Alphonse style, particularly in view of the determined effort on the part of the railroads to quash ship competition coastwise, intercoastally, and on rivers, by securing Fourth Section Relief.

In spite of the statement that there is little or no scientific information available about shipping requirements, subsidies, tonnage requirements, etc., the Fortune Magazine has done itself proud. They tackled one of the world's most confusing issues and did a very creditable job—even if they left the matter confused and with impressions hurtful to our national program. There is an abundance of material available. Congress struggled with this merchant marine picture in 1789; in fact, the Constitutional Convention came into being because of it; and we have struggled with the program ever since. But when the information sought is presented by those intrusted it becomes the "shipowners' sob story," or a colored piece of propaganda.

Our war-built fleet met an emergency. When this emergency was over a try was made to sell the ships. To give the operator a chance to compete and to get the Government out from a fifty million dollar per year operating loss the price was knocked down. But still the fallacy of the war costs are repeated. In 1914 the world fleet consisted of about forty-nine million gross tons, valued by a great London firm of experts at one and one-half billion dollars. We built some twelve million gross tons and they cost us about three and one-half billion dollars. One-fourth of the tonnage cost us two and one-third times more. Why then harp on cheap tonnage? And that tonnage was outdated when it was launched.

Says Lord Essenden, one of the world authorities on shipping:

"In view of the higher costs in the United States, principally in construction, they clearly cannot have a mercantile marine without subsidizing it, and so long as the subsidy does not exceed these higher costs my own personal view is that no serious objection can be made."

That is a recognition of parity. And that is all that the American shipowner asks for; that is all he should get, and that is all he is entitled to. But he is definitely out of the running without parity. He cannot secure one more cent for freight or passage than his nearest competitor. With equality in initial cost and operating expenses he should and can stand up against any competition in any United States overseas trade route. Without it he cannot. That is a very simple mathematical determination. But any profit made, based upon parity, is not entitled to the persiflage description of a facile pen as "Gift Horse Profit, "Profits nothing but white lies," "Lush nap of subsidy income," and the collection of these subsidies as "Charming, formal little routine with the Post Office."

These statements are on par with the illustrations of adverse publicity given by Mr. Garett Garrett in the Saturday Evening Post, February 16, 1924, wherein he states:

"What shall one make of it? Prejudice, awkwardness, impishness, indifference, a want of pride in our own? . . . What else?

"If there is British propaganda in it, as some think, are we not silly to let them do it to us, however they do it? If there isn't, are we not sillier still to think there is and not know what we are doing to ourselves?"

Fortune suggests there are "too many ships and not enough cargoes to support them." This is what Fairplay thinks of it:

"It is practically certain that if a war like the last one broke out tomorrow or next year the difficulties met with during the period 1914-1920 in finding sufficient transports would be repeated."

And the fact is that while the Fortune article was being prepared the

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For American

A Department Devoted to the Problems of
in the American

The cordial greetings of Pacific Marine Review and of all concerned in the preparation of this section are extended to the present and future deck officers of the American Merchant Marine, as we start this department devoted to their general welfare and their professional advancement.

Herein, as our general theme develops, will be explained the reasons for installing and the results derived by using the various mechanical and electrical appliances, the equipment, and the data on general subjects, which today are increasingly necessary for the navigation and the management of our modern seagoing vessels.

Herein, too, we shall gather up the experience of licensed officers at sea and in port to be passed along in a mutual exchange of information.

It is a truism that no man can really appreciate the present state of an art without some knowledge of the evolution of that art in the past. For that reason we are starting this series with a brief outline of some highlights in the development of the American Merchant Marine in sailing ship days, beginning about 1800 and ending about 1860, when the steam vessel began to be important in overseas shipping.

A Hundred Years Ago

Hemp rigging, rope fittings on yards and masts, and linen sails were the standard equipment of all sailing vessels in the year 1800. Cargo was not offered at freight offices, but those American ships that were sailing the seven seas were traders, owned by merchant shipowners, mostly in the New England states and New York. These vessels carried cargoes that were sold in the Orient and other ports, where return cargoes were purchased to be auctioned off on the vessel's return to her home port.

Some of these merchant owned vessels carried a supercargo who handled the ship's business, and on other ships all the vessel's business was handled by the master. There were no licenses for officers. The master was either part owner, whole owner or appointed by the owner for his ability as a seaman, for after their vessel sailed from the home port the remainder of the voyage was at the option of the master and his judgment as to where the most advantageous purchases could be made and the most profit realized upon their sale after arrival at the home port.

Cases of a supercargo being appointed master were rare, but one was outstanding. Nathaniel Bowditch, who started working as an apprentice rigger and developed a passion for mathematics, sailed as captain's clerk in 1796 on the ship Henry. On his voyages he spent all his spare time working on navigation and taught many members of the crews to work Lunars, the only method of finding longitude without the use of a chronometer. In 1800 the traditional method of navigation on American vessels was by dead reckoning, by compass, log, and deep sea lead. Voyages across the Western Ocean and to the West Indies were made without incident by these methods, but in circumnavigating the world and voyages to China and the East Indies, many difficulties were encountered and the need of a more practical method of finding a vessel's position was appreciated by Bowditch. He checked the English Standard book of navigation, found 8,000 errors, decided it was not practical, and in 1800 wrote his own book with tables and called it the "Practical Navigator." This book, commonly known as Bowditch, although changed many times, is still used and known by the same name. Shipowners were reluctant about the purchase of chronometers, and there is on record a case where the master of a vessel purchased a chronometer in England, and the owner stated that he would have rather set fire to the vessel before sailing than to have had the master disregard his instructions for economy to this extent.

In 1810 an American vessel was seized at Christian Sand and condemned by the Admiralty Courts of Denmark as having sailed from England (Denmark then being at war with England) because they could find neither chart nor sextant on board, but by protest of other American shipmasters that they neither had charts or sextants, the vessel was released. Bowditch, however, was made master in 1801, and proved himself to be not only an able seaman, but the best navigator of his time.

About 1825 there were many changes in shipbuilding, the design trend was toward finer lines, doing away with the bluff bow and changing the rigging and spars. There were no more quarter galleries or "ginger bread" work, the only remaining

Deck Officers

Masters and Mates Aboard Seagoing Vessels Merchant Marine

adornment was the figure head or billet-head and a small scroll or shield on the transom. By 1840 the sailing vessel of that day was a trim-looking craft in comparison with her sister of 1820. Iron fittings took the place of rope on spars, masts and bowsprit. New England-made cotton canvas was standard sail cloth. Dry-docks were not available on long voyages, and many vessels were beached and hauled down, first on one side and then on the other while the bottoms were cleaned. At times this work was accomplished on South Sea islands, where part of the crew stood guard against unfriendly natives.

It is interesting to note at this time that the brig Pilgrim, the vessel on which Richard H. Dana made the voyage to the Pacific Coast, and which was the voyage described in his famous book, "Two Years Before the Mast," was 113 feet long and of about 400 tons burden. The standard foods as served on vessels of the 1840's were potatoes, water, hardtack, molasses, salt beef (salt horse) and salt pork, which were prepared and served by ships' cooks to the best of their ability. Hash and lob scouse were two of the staple dishes which were never missing.

The finding of gold in California opened a new field of business for the shipowners of the Atlantic Coast. Vessels were needed which would be larger, carry more passengers, and make more speed, as freight rates were never higher and the demand for passenger space never greater. From this demand developed the Clipper ship, smart lined, lofty masted, and with the ability to outsail the vessels of any period. This, combined with men with reputations as seamen, put the American clipper in a class by herself. There are records of speeds made by these vessels that are far in excess of the speed made by the average freight steamer of today. The Lightning averaged over 15 knots for ten days, making over

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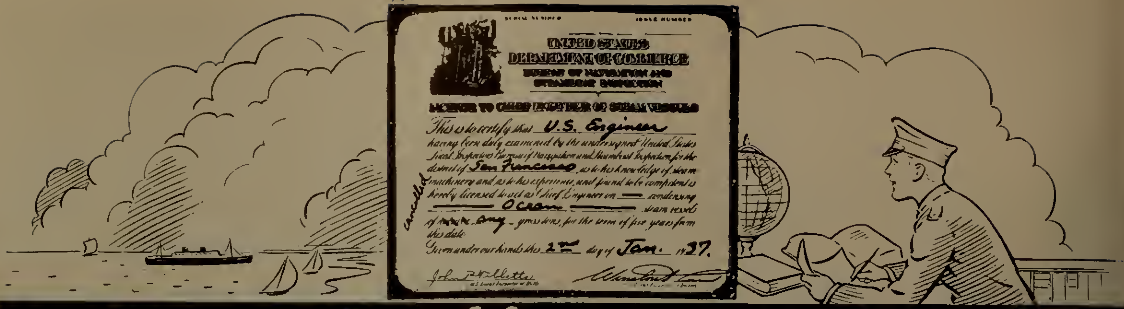
CHANGE OF MASTERS

Stmr. F. H. Hillman:—S. C. Sullivan; vice, J. A. Christenson.
Stmr. Mana Stephen: — G. King; vice, R. J. Melanphy.
Stmr. Golden Cross: — F. E. Trask; vice, O. Bergman.
Crowley launch No. 21:— Niels Jessen; vice, L. H. Delphy.
Stmr. Susan V. Luckenbach:— K. A. Bergman; vice, Robert McKinnon.
Stmr. Point Judith:—J. T. Larsen; vice, William Murray.
Stmr. Arkansan:—J. H. A. Gries; vice, Paul R. Jones.
Stmr. Diamond Head:—O. Bergman; vice, F. E. Trask.
Stmr. W. S. Rheem:—G. A. Johnson; vice, R. A. Stahl.
Stmr. President Garfield:—A. W. Aitkin; vice, D. C. Austin.
Stmr. Makua: — C. L. Brocas; vice, F. M. Graham.
Stmr. Isthmian: — K. Hansen; vice, D. S. Baker.
Stmr. Georgian: — E. H. Brunn; vice, B. Leep.
Stmr. J. C. Fitzsimmons: — E. K. Smith; vice, S. S. Dunnell.
Stmr. Paul Shoup:—G. A. Moerman; vice, F. W. Rosvally.
Stmr. W. S. Rheem: — H. O. Bleumchem; vice, R. Pettersen.
Stmr. Point Clear:—W. Petersen; vice, Peter Odeen.
Stmr. Mericos H. Whittier:—G. B. McDonald; vice, G. A. Moerman.
Stmr. Los Angeles (tanker):— Otto Weideman; vice, O. A. Ojstedt.
Stmr. Arkansan:—Paul R. Jones; vice, J. H. A. Gries.
Stmr. Georgian:—B. Leep; vice, E. H. Brunn.

Deck Officers' Licenses

The following list shows the licenses granted during the month of August to deck officers of the merchant marine at Pacific Coast offices of the Bureau of Marine Inspection and Navigation. For key to abbreviations see footnote.

Name and Grade	Class	Condition
SAN PEDRO		
George W. Bright, 2nd Mate	OSS, any GT	O
John F. Gillen, 2nd Mate and Pilot	OSS, any GT	RG
SEATTLE		
Otto H. Karbbe, Chief Mate	OSS, any GT	RG
David E. Parker, 3rd Mate	OSS, any GT	O
SAN FRANCISCO		
Irving E. Baker, Master	OSS, any GT	O
George F. Martin, Master	OSS, any GT	O
Frank J. Wood, Master	OSS, any GT	RG
Julius M. Berrey, Chief Mate	OSS, any GT	RG
Lindal Ness, Chief Mate	OSS, any GT	RG
Cecil O'Hara, Chief Mate & Pilot	OSS, any GT	RG
Richard Georgian, Chief Mate & Pilot	OSS, any GT	RG
Erling Osberg, 2nd Mate	OSS, any GT	O
Harold E. Routery, 2nd Mate	OSS, any GT	RG
Floyd R. Behringer, 3rd Mate	OSS, any GT	O



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

QUESTION

Can machines be balanced in their own bearings without dismantling?

ANSWER

Small units, auxiliaries, motors, mechanical drive turbines, may sometimes be adequately balanced by running in their own bearings. It is a difficult job.

A procedure for a running balance will be sent to any engineer writing in to "The Chief" and requesting it.

QUESTION

What is meant by the "throwout" of a revolving shaft?

ANSWER

The throwout of a shaft is the amount the shaft wobbles, and also the distance its center moves back and forth, or the diameter of the circle in which its center travels. The term also applies to the point on the shaft farthest from the center of rotation. This point would be marked with a chalk or pencil held close to the shaft to just touch the point of throwout. The machinist marks this point on the piece in his lathe when it is not running true.

QUESTION

Does the point of throwout as marked with chalk on a revolving shaft also mark the heavy side of the rotor? That is, can weights be added to the side 180° away or opposite to the throwout to balance the rotor?

ANSWER

No. The point of throwout, contrary to the usual misunderstanding, does not mark the point of the unbalance weight. At the critical speed

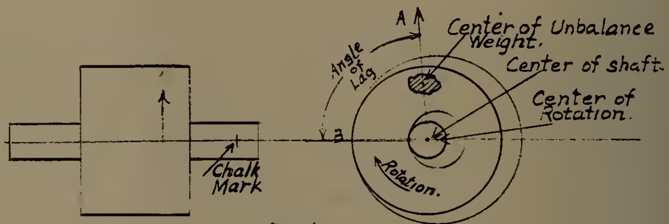


Fig. 1.

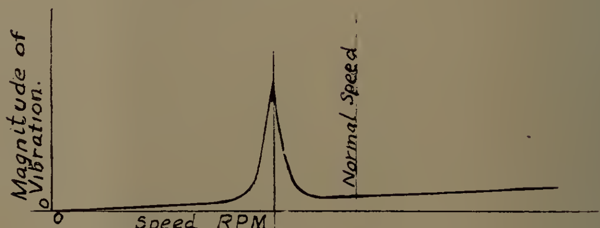


Fig. 2.

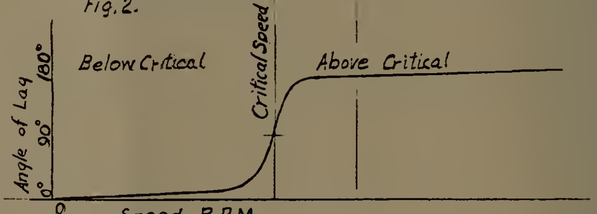


Fig. 3.

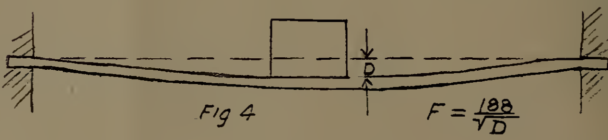


Fig 4

the point of throwout is 90° behind the point of unbalanced weight. At speeds above the critical the angle of lag will be nearly 180°.

QUESTION

What is meant by the angle of lag?

ANSWER

It is the angle in degrees between the point of throwout and the center of unbalanced weight. Refer to Fig. 1. The unbalanced centrifugal force is in the direction of the line A, but the point marked by the chalk on the shaft is on the line B. As referred to the direction of rotation, this mark will always be behind or follow the center of unbalance.

QUESTION

How much is the angle of lag?

ANSWER

By referring to Fig. 3 it will be noticed that below critical speed the angle of lag is less than 90° and above the critical speed the angle is more than 90° but less than 180°. This curve plots the angle of lag against the speed of revolution. To determine the angle of lag we must know the speed at the time the mark was made on the shaft and the critical speed. Hence the marking of the shaft is a very unsatisfactory reference as far as locating a balancing weight is concerned.

QUESTION

What is the critical speed?

ANSWER

This is a much misunderstood point concerning rotating machines, and is well worth more space than can be afforded it here.

In bringing any unbalanced machine up to speed from standstill the amount or magnitude of vibration increases with speed, due to increase of centrifugal force of unbalanced weight. But with many machines it increases to a maximum at some speed less than normal, and then as speed increases the vibration decreases and may run fairly satisfactorily at normal speed, although at point of maximum vibration it was very severe.

The point of maximum vibration is called the critical speed.

If we plot speed in r.p.m. against magnitude of vibration we get a curve somewhat similar to that shown in Fig. 2. Some machines have their normal speed less than critical, others above it. It is unfortunate indeed if normal speed occurs at critical, as the machine must then be in perfect balance, a condition hard to attain.

Designers calculate the critical speed and deliberately change the design to move the critical away from normal, preferably to place it well above normal.

With large machines it is impossible to design the critical above normal, hence the machine vibrates through critical speed but runs satisfactorily at normal speed.

Every system having any degree of freedom of motion has its own critical speed or rate of vibration. Every engineer has noticed some valve handle, pipe, rod, bracket, or brace which vibrates badly when the ship's engines are turning at some particular speed, but does not vibrate at speeds above or below the particular one. When thus vibrating the part is being excited or energized at its own particular critical speed. It does not respond to other speeds. The violin string vibrates when excited by a musical note corresponding to its own tuned frequency, or its critical vibration rate.

QUESTION

What are the elements which determine critical speed?

ANSWER

They are the mass or inertia or weight of the moving piece, and the spring effect or the force which returns the part to its normal position when it is displaced. They are related thus: $\text{Frequency} \sqrt{\dfrac{\text{spring effect}}{\text{weight}}}$

The spring effect can be best measured by the displacement when its own weight deflects its spring effect. Thus, when a weight is loaded on a spring it displaces a certain amount. This may be used to calculate the frequency or critical rate of vibration. This rate is natural frequency of vibration.

The following formula applies:

$F=\dfrac{188}{\sqrt{D}}$, where F is the natural frequency of vibration in oscillations per minute and D is the displacement in inches when the weight in pounds is placed on the spring.

Refer to Fig. 4. Suppose a 6 pound weight applied to the strap spring were to deflect it 1.2 inches. Then by the above formula the natural frequency of vibration would be 172 oscillations per minute. If the spring were so strong that 50 pounds were required to deflect it the same 1.2 inches, the natural frequency would be the same.

The weight of the spring must be considered if it is large as compared to the dead weight. Friction will absorb and finally stop the vibrations unless maintained by some forced frequency of the same value, such as a vibration of the system from the main engines.

From the above it will be noted that the designer can control the natural frequency or critical speed. He makes the shaft or bearings stiffer, more rigid, if he wants to raise the critical. He makes the part heavier if he wants to lower it. Or again he can raise the critical by reducing the weight or lower the critical by making the spring effect weaker, a more limber shaft or less rigid bearing support.

Our next article will discuss dynamic balancing.

Questions from the Field

QUESTION

While your articles on turbines are valuable, they do not interest the engineers on our ships, as we have reciprocating engines and diesels. Why not write on subjects of more interest to the majority of us?

E. H. D.,
Seattle.

ANSWER

I am glad you have brought up this subject. The background purpose of this department is to be of "general educational value" to the marine engineer. To fulfill this purpose my articles must be both interesting and educational; the first, so that you will read them; the second, so that you will learn something.

In time I hope to cover the entire field of marine engineering, but this will require several years and leaves the questions: What are you inter-

Engineers' Licenses

JUNEAU

Carl B. McLure, 2nd Asst. Eng.	OSS, any GT	RG
Swan O. Peterson, Chief. Eng.	OMS, 2500 GT	RG
1st Asst. Eng.	OMS, any GT	RG
Frank P. Oldenburg, Chief Eng.	OMS, 500 GT	RG
2nd Asst. Eng.	OMS, any GT	RG

PORTLAND

Elmer H. Hellis, 3rd Asst. Eng.	OSS, any GT	O
Otto A. Sundquist, Chief Eng.	OMS, 750 GT	O

SAN PEDRO

Jennings P. Johnson, Chief Eng.	OSS, any GT	RG
Harold S. Goller, 2nd Asst. Eng.	OSS, any GT	O

SAN FRANCISCO

Frederick P. Coulter, Chief Eng.	OSS, any GT	RG
Elwood T. Gibbons, Chief Eng.	OSS, any GT	RG
Alexander D. Lawlor, Chief Eng.	OSS, any GT	RG
Benjamin W. Murray, Chief Eng.	OSS, any GT	RG
Herbert W. Shaw, Chief Eng.	OSS, any GT	RG
Dorus L. Crawford, 1st Asst. Eng.	OSS, any GT	RG
Joseph Sutherland, 1st Asst. Eng.	OSS, any GT	RG
Gustave A. Vergelius, 1st Asst. Eng.	OSS, any GT	RG
James C. Barry, 2nd Asst. Eng.	OSS, any GT	O
Francis M. Cabral, 2nd Asst. Eng.	OSS, any GT	O
Joseph Knapp, 2nd Asst. Eng.	OSS, any GT	RG
Joseph R. Shafer, 2nd Asst. Eng.	OSS, any GT	RG

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

ested in most? What shall I cover first?

I list below some subjects, and ask every reader to please send a post-card and name the subject in which he is most interested. Address "The Chief," Pacific Marine Review, 500 Sansome Street, San Francisco, California.

List of Proposed Subjects

Turbines
Boilers
Feed water treatment
Feed pumps
Condensers
Feed water heaters
Auxiliaries
Electricity, AC and DC
Generators
Motors
Switchboards and motor control
Heat transfer and losses
Thermodynamics
High temperatures and pressures
Unusual engine and turbine combinations
General rules and regulations
Fuel oil
Diesel engines
Reciprocating steam engines.

QUESTION

What is meant by the term "steeple compound engine"?

G. S. H.,
San Francisco.

ANSWER

The term steeple compound has been used to apply to the very large quadruple expansion four cylinder vertical marine engine where the high pressure cylinder is mounted above the low pressure cylinder, giving the general effect of a steeple of a church. This construction was used on engines 15,000 to 20,000 H.P. or more on some of the famous Atlantic express liners to shorten the crank-shaft.

QUESTION

I have heard that the new light weight, long distance German submarines take their power for propulsion from the sea water. Is this something new in science, and why is it not more generally used for surface vessels? How can there be any fuel value in sea water?

M. E. R.,
San Francisco.

ANSWER

There is no fuel value or energy in sea water. The German submarines do not derive their propulsion power from it. They do, however, disassociate sea water into oxygen and hydrogen, the component elements of water, and store these gases. Later, when submerged, they burn these gases in the diesel engines. The exhaust is passed through a condenser and emerges as water, which is pumped overboard. A great deal more power and fuel is required to disassociate the water into gases than is obtained from them in burning in the engine.

The system's advantage is to submarines only. It eliminates the very large and heavy storage battery.

When at the surface, either under way or tied up, they run the engines and generator. The electric current is passed through special cells through which sea water circulates. The hydrogen is formed on one electrode and oxygen on the other. These gasses bubble to the surface under pressure and pass off to steel containers or bottles.

When submerged, one of the gases, probably hydrogen, is admitted to the engine on its suction stroke. The opening of the injection valve admits the oxygen, which burns the hydrogen into steam, later condensed to water.

The losses of such a system are many, and so far in this country it is only considered a laboratory plaything. First, we have the losses of resistance of the sea water. This may be reduced by adding more salt or acid, so that too much voltage is not required to pass the current through the water. Then we have the energy of compression, which is probably not recovered in the engine, or only partially so. It would be a safe guess to say that the energy from engine is less than half the energy required to disassociate the sea water. A storage battery would be considerably more efficient, but of course much heavier and bulky.

The system also gives the full power of the engines to propulsion submerged. With storage battery submarines the generator, used as a motor under water, must be large enough for propulsion. With this new system the generator may be quite small if it can be operated for a much longer time at the surface than is required from the engines when submerged.

Shipping Calendar

September, 1937

● **September 1**

The September (Merchant Marine) issue of Fortune appears. See article "Fortune at Sea," page 29 this issue.

The Teamsters' Union starts blockade of San Francisco waterfront.

● **September 2**

Great typhoon hits Hongkong, with wind velocities up to 164 miles an hour. The Asama Maru, large Japanese passenger liner, is driven ashore outside the harbor.

● **September 3**

Pacific Hemlock and Pacific Pine, two Maritime Commission steamers, are bought by the States Line of Portland, and rechristened respectively Vermont and Maine.

● **September 4**

The steel motorship Carriso, formerly Magunkook, built at Long Beach in 1919, is sold to Eugen Matkovic of Split, Jugo Slavia, transferred to Jugo Slavian registry and renamed Nickolina Matkovic.

● **September 5**

San Francisco Chamber of Commerce announces that 492 vessels arrived in that port during August, with an aggregate net tonnage of 1,520,202, and 480 ships cleared with an aggregate net tonnage of 1,557,194.

● **September 6**

This date marks the 10th anniversary of Coast to Coast commercial air transport. Planes on United Air Lines Pacific Coast - Chicago - New York route as of September 1 had carried 1,075,359 passengers, 42,352,951 lbs. of mail, 8,039,927 lbs. of express, and had run 120,209,435 miles.

● **September 7**

Roger D. Lapham, president American-Hawaiian Steamship Company, accompinied by Mrs. Lapham, land in San Francisco from the Oceanic liner Monterey after an extensive tour of the Pacific, including Japan, China, the Philippines, Java, Australia and New Zealand.

● **September 8**

Tremendous increases in shipments of piling from Oregon to Atlantic Coast and way points have caused great demand for flat cars on the serving railroads. The movement now amounts to 1600 carloads a month, and is increasing.

● **September 9**

The new president of the Pacific Coast Association of Port Authorities is A. H. Averill, vice chairman of the Portland Commission of Public Docks. Next year's meeting of the Association will be in Portland.

● **September 10**

Pacific Coast — European Conference announces that fresh apple and pear rates will remain stationary for the 1937-38 season, and rates on all other commodities will be raised, effective October 1.

● **September 11**

Japanese express liner Kiyokawa Maru arrives at Los Angeles harbor 11 days from Yokohama, and discharges 1000 bales of silk for rail shipment to New York.

● **September 12**

The Maritime Association of the Port of New York issues a statement demanding complete overhaul of the Merchant Marine Act of 1936, charging that the Act fails to provide parity between the American shipowner and his foreign competitor.

● **September 13**

Chairman Joseph P. Kennedy of the U. S. Maritime Commission issues statement declaring that the U. S. Merchant Marine faces a crisis because of the "apparent inability" of certain private operators to finance their share of construction costs.

● **September 14**

Japan declares blockade on the China Coast.

● **September 15**

The Moore Dry Dock Company of San Francisco and Oakland officially opens a new half million dollar steel fabricating shop at its Oakland yard.

● **September 16**

Bids are opened by the Maritime Commission on the new luxury liner to run alongside the Washington and the Manhattan, of United States Lines. Newport News bid is lowest by a wide margin and is so close to the estimated cost that the chances of an award seem very good.

● **September 17**

U. S. State Department warns American vessels to stay off a "danger zone" along the China Coast and to have an American flag painted on the top decks "in a conspicuous manner."

● **September 18**

Japanese express motor tanker Toho Maru arrives at Los Angeles harbor from an 11,000 mile round trip to Chemulpo, Chosen, made in 33 days, including 5 day layover. This is said to be the record round voyage from California Coast to Asia mainland.

● **September 19**

Isthmian steamer Knoxville City and American-Hawaiian steamer Arkansan collide almost at the center of the 2200 foot channel into Los Angeles—Long Beach harbor, with damage estimated at $160,000 but no loss of life.

● **September 20**

Pacific Coast Maritime Unions demand $100 bonus per man per voyage for shipping on American ships to Asiatic ports in the blockade zone.

● **September 21**

Two Japanese freighters, the Kano Maru at San Francisco and the Hikawa Maru at Seattle, discharge 128 bars of gold and 580 bars of gold respectively. Total value over $7,000,000.

● **September 22**

Great schools of tuna appear off the mouth of the Columbia. Oregon canners for first time in history are canning tuna this week.

● **September 23**

The National Marine Union demands 20 per cent increase in pay for all unlicensed personnel on certain transatlantic and intercoastal

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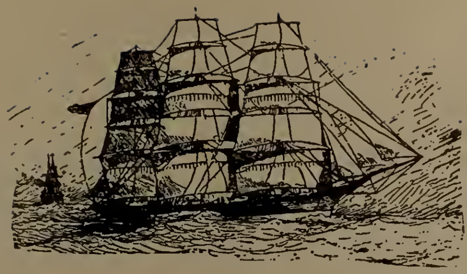


Pacific Ocean Shipping and

A Survey of the Month's Developments

During the month of September the principal factor affecting Pacific Ocean and Pacific Coast shipping undoubtedly was the Japanese invasion of China and the repercussions of that "incident" on the official mind at Washington.

The large foreign trade of Shanghai has, of course, been greatly reduced. Official figures follow for our commercial attache at Shanghai:

"The recorded foreign trade of Shanghai for August was principally in the first 12 days of the month, or prior to the outbreak of hostilities; foreign trade being virtually at a standstill during the remainder of the month. August imports totaled 28,160,000 yuan, as compared with 77,650,000 yuan in July and 46,590,000 yuan in August, 1936. Total imports for the first eight months, January-August inclusive, were valued at 468,760,000 yuan, compared with 363,390,000 in the corresponding period of 1936.

"Shanghai's exports during August totaled 23,760,000 yuan, compared with 52,890,000 in July and 28,260,000 in August of last year. Total exports for the January-August period were 325,650,000 yuan, compared with 232,520,000 in the same period last year."

Japanese commercial losses also are heavy:

"Japanese officials announce Japan's trade with China in August this year was as follows: exports to North China, 1,564,000 yen; to Central China, 1,581,000 yen; and to South China, 36,000 yen; as compared with August, 1936, when exports to North China totaled 4,555,000 yen; to Central China, 7,196,000 yen; and to South China, 406,000 yen. Imports from North China in August totaled 4,140,000 yen against 3,800,000 yen in August last year; from Central China, 4,380,000 yen against 5,000,000; and none from South China in August this year or last year."

This same condition is reflected in the following statement from the United States commercial attache in Tokyo:

"China situation reflected in losses in Japan's foreign trade not only with China proper but with Hongkong, Philippine Islands, Straits

A Monthly Review of Tanker Markets

Williams, Dimond & Co., Oscar J. Beyfuss, Mgr.,
Chartering Department

The general tendency is firm but the market activity is not entirely reflected in the Review.

● Time Charters.

A large new diesel was fixed last week for 6/9 months, spot delivery, at 14/-, another ready November 6 months 15/-. Diesel owners asking 12/- for a year, steamers asking about 8/- 12 months.

● Voyage Charters.

AMERICAN: Gulf to North of Hatteras: Dirty chartering ranging around 30c-32c, clean at almost the same rates.

Intercoastal: Still no transactions.

FOREIGN: Gulf to U.K. Continent: Clean fixtures were few but at higher rates, 29/6 and 28/6 is recorded, while dirty fixtures were 25/6 and 26/6. Numerous charters were made from Aruba/Venezuela 22/6 and 23/- clean and many 21/- and 22/6 dirty.

California to U.K. Continent: No charters recorded.

Black Sea to U.K./Continent: No charters recorded.

Black Sea-Far East: Just after last month's review was published we learned of a clean fixture 40/- Japan.

California-Australia and New Zealand: No charters.

California-Far East: 30/- Japan was the market for dirty tonnage, since when 33/6 is reported.

● World Tanker Construction.

An eminent authority calculates the world's tankers under construction will only increase the fleet 3% per annum, not taking into account the additional speed of some tankers, figuring only the gross and/or deadweight and making proper calculations for replacements.

Our figures show that at the present time there is under construction and on order about 15% of the new vessels, while those under construction as of this spring are 7% of the total, hence the above estimate seems to be correct.

Very recent figures show that the American tankers under construction and contracted for will eventually add about 12% to the American fleet, but it is not expected that these will all be added this year. Such a large proportion of our tankers are very old (83% are fifteen years and over) and slow, that the above percentage only balances those (a little over 11%) that are over twenty years old, theoretically ready for retirement.

Pacific Coast Port Notes

in the Pacific Maritime Industry

Settlements and Netherlands Indies, through Chinese boycott activities in those areas. Losses to Japanese plants in Shanghai area estimated at 50,000,000 yen, with additional 50,000,000 yen business loss along Yangtze River.

"September 3 Diet session featured by complete support of Government's control and financial measures. Among major Government bills introduced was supplementary budget calling for expenditures of 2,245,400,000 yen, out of which military expenditures total 2,042,000,000 yen, extending to March 31, 1938, total to be derived from bond issues. Other bills introduced include: the ship control bill, providing for adjustment of general marine transportation in connection with the China incident; and the fertilizer distribution control law, adjusting the demand, supply, prices and consumption of fertilizers for the duration of the China incident."

Washington is frowning officially on American vessels risking themselves within the waters included in Japan's illegal blockade, and altogether the Oriental trade is in a rather official state of jitters. On the other hand, charters and freights are very firm, at higher rates than have existed for some years past. The ship operators are further worried by the exorbitant demands of maritime labor for a bonus which would wipe out nearly (if not quite) all of their possible profit.

Meanwhile, the various Federal commissions are holding hearings and trying to make up their official minds as to what new regulations and what changes in existing regulations might be beneficial to the merchant marine. One of these (not always associated in the lay mind with the Merchant Marine) is the Federal Communications Commission. This body is holding a series of hearings in ports to get the minds of shipping men and others on the rules for applying the radio rules of "The convention for safety of life at sea" as recently ratified by the U. S. Senate.

Many interesting legislative questions lie behind this hearing, and we are offering here a brief summary of these matters so that our readers may intelligently follow these hearings.

A Brief Survey of Radio Legislation

The "Act to Require Apparatus and Operators for Radio Communication on certain Ocean Steamers" (commonly referred to as the "Ship Act"), approved June 24, 1910, as amended by an Act approved June 23, 1912, established certain requirements, and amongst other things specified that all United States vessels operating on the oceans and Great Lakes and carrying 50 or more persons, whether crew or passengers, should be equipped with radio apparatus capable of performing over certain distances.

The International Telecommunications Convention, held at Washington, D.C., 1927, did a great deal toward clarifying the chaos into which frequency assignments had fallen, and laid the ground work for the next Convention, which was held in Madrid, Spain, 1932. This latter Convention established the classification of ship services and licenses, legalized the Safety and Urgent signals, decreed that all spark apparatus should be removed from all vessels prior to January 1, 1940, and provided for the recognition of auto alarm devices for the purpose of maintaining continuous watch on certain vessels.

Meanwhile, the major maritime nations had participated in a conference in London, which resulted on May 31, 1929, in the International Agreement, known as "The Convention for the Safety of Life at Sea, London, 1929." The Convention in due course was ratified by a majority of the countries interested. This Safety Convention classified vessels as Cargo or Passenger, and required all vessels over 1,600 gross tons, when engaged in International voyages, to be equipped with main and emergency radio equipment. Continuous radio watch was required on all cargo vessels over 5,500 gross tons and on all passenger vessels over 3,000 gross tons, subject to certain exemptions at the discretion of the individual administrations. Continuous watch was to be maintained by one radio operator and an auto alarm, or by two or more radio operators. In addition, the Safety Convention required radio direction finders on all passenger vessels of 5,000 gross tons or over.

The Government of the United States, having failed to ratify the Safety Convention, radio matters aboard vessels of this country were still controlled and governed by the antiquated "Ship Act." However, the

Communications Act of 1934 established the Federal Communications Commission, and delegated to it the powers and duties of the Federal Radio Commission, which had been a regulatory Commission of the Department of Commerce. This Act authorized the newly formed Commission to assume the duties of enforcing the Ship Act, the inspection of installations, and the issuance of licenses and frequency assignments. Shortly thereafter, the Senate of the United States began hearings on matters affecting Safety of Life at Sea, which resulted on June 19, 1936, in their ratification of the London Safety Convention, subject to certain understandings. The Senate resolution was signed by the President of the United States July 7, 1936, and deposited in London on August 7, 1936. In accordance with Article 65 of the Convention, the effective date, as applied to vessels of the United States, was November 7, 1936.

The Federal Communications Commission on October 1, 1936, issued its Ship Radiotelegraph Safety Instructions, setting forth the requirements of law as of November 7, 1936, specifying that the Instructions supplemented, but did not supersede, existing requirements of the Ship Act of 1910. The Instructions outlined the procedure to be used in applying for certificates, the inspections that were required, technical descriptions of apparatus, spare parts, and other regulatory features of the Convention. The Instructions further stated that no type of auto alarm had at that time been approved for use aboard United States vessels.

On March 10, 1937, the Federal Communications Commission issued its Order Number 28, in which it approved, after exhaustive tests, the auto alarm devices submitted by the two major radio companies, and made the approval effective date July 10, 1937, with an extension of the exemption provided for in the Safety Convention up to and including August 6, 1937.

Meanwhile, on May 20, 1937, Senate Bill 595 had been passed by Congress, approved by the president, and had become law. This Bill, sometimes known as Public 97, was an amendment to the Communications Act of 1934. It repealed the Ship Act of 1910 as far as it applied to ocean-going vessels, and drastically increased the radio requirements of United States vessels beyond those of the Ship Act and of the Safety Convention. Radio apparatus, both transmitting and receiving and auto alarms, was made obligatory on all cargo vessels of 1,600 gross tons or over plying anywhere on the ocean, whether coastwise, intercoastal, or foreign. Passenger vessels of 100 gross tons or over were included in the continuous watch class.

The next day, May 21, 1937, the Federal Communications Commission issued its Order No. 29 and its Ship Radiotelegraph Safety Rules. The latter superseded and repealed the Ship Radiotelegraph Safety Instructions of October 1, 1936. This Order No. 29 extended to August 6, 1937, the effective date of the continuous watch (auto alarm) and apparatus requirements of the new Act as it affected cargo vessels, and as had been done for the requirements of the Safety Convention in the Federal Communications Commission Order 28 of March 10, 1937.

Subsequently the Commission, being in receipt of numerous requests on behalf of United States vessels for a further extension of the exemption period, found it was impractical for all vessels to obtain the necessary equipment prior to August 6, 1937, and on July 28, just nine days before the dead-line date, in its Order 29-A, extended to November 6, 1937, the time required for the completion of all installations. The extension was made contingent upon the actual placing with a manufacturer of an order for the necessary equipment. S-595, or Public 97, or, as it should be known, the Communications Act of 1934 as Amended May 20, 1937, provided for certain exemptions from the requirements of the law. Many steamship companies made application to the Commission for such exemptions, among them a number from the Pacific Coast, and the Commission, acceding to those requests, has decided to hold a hearing on such exemptions at San Francisco October 11, 1937.

All interested parties having filed the necessary applications, affidavits, and statements, will attend this hearing. It is not anticipated that the Commission will give an immediate answer to the requests. It is more likely that further limited exemptions will be granted, pending the ultimate decision of the Commission.

Ingalls' Towboat Model

This interesting miniature is a complete exact scale model of the standard stock river towboat manufactured by the Ingalls Iron Works Company of Birmingham, Alabama. Many of these towboats are doing efficient service on the southern river systems. The model is floating on a lily pond in the garden of the Birmingham home of Robt. J. Ingalls.

Dynamometer for Towboat Pull

The testing of the towing power of tugs or towboats under actual operating conditions for river towing has been made possible by the development of a dynamometer barge, which has been built by the Dravo Corporation at its shipyards on Neville Island, near Pittsburgh.

While Bollard tests of towboat power have been commonly made in the past, these did not necessarily give a true indication of the results in actual service, since the vessel in such a test would be stationary; the slip of the propeller would be at a maximum; and there would be a certain amount of back current from the wharf or dock where the test was made.

The dynamometer barge, on which Dravo Corporation has applied for patents, is a standard 100 x 26 foot steel river barge which is placed between a towboat and the barges constituting the actual load. The towboat is lashed to a floting frame on the barge. This consists of a welded structure riding on live rollers which give it free movement fore and aft but do not permit any movement athwartship. Four sets of rollers are provided at each of the three bearing points which support the floating frame. The top and bottom units consist of two rollers and the side units of three rollers.

The frame has a width of 20 feet from center to center of bearing supports which are at the extreme end of the barge. Adjacent to and overhung from these bearing supports is the heavy beam by which the towboat is attached to the frame.

The towboat never touches the dynamometer barge. Its entire thrust or pull is exerted on the frame which operates two hydraulic rams. Each has an area of 100 square inches. The two rams are placed so as to take the thrust or pull in either the forward or astern direction. These register the amount of thrust or pull upon recording and indicating gages provided for each ram. The gages are placed in a cabin set between the rams.

Dravo has found the dynamometer barge to be of particular value in testing the performance of vessels both with and without Kort nozzles.

While this barge is designed for inland waters service, the idea of a hydraulic dynamometer mounted on a float could readily be applied to the testing of harbor and seagoing tugs.

Upper: Tug Mary Alice and dynamometer barge. Lower: Dynamometer on barge.

Shipping Calendar

(Continued from Page 37)

lines, for which it is the recognized collective bargaining agency.

● **September 24**

The A. F. of L. affiliate Teamsters' Union of San Francisco pickets the Embarcadero in a demonstration against the C. I. O. affiliated Longshoremen's Union. The teamsters had, since September 1, refused to move cargo from the docks.

● **September 25**

McCormick Lumber Company announces complete redemption of its outstanding 6 per cent bonds by November 1 and a readjustment of corporate organization, which will transfer to the McCormick S. S. Co. all vessels and transport facilities now owned by the McCormick Lumber Co.

● **September 26**

The Maritime Commission announces that it has arranged a temporary operating subsidy agreement for six months with the American Mail Line of Seattle, a Dollar Line affiliate.

● **September 27**

Cargo in and out of the port of Honolulu during the month of August rolled up the greatest total of any month in the history of that city.

● **September 28**

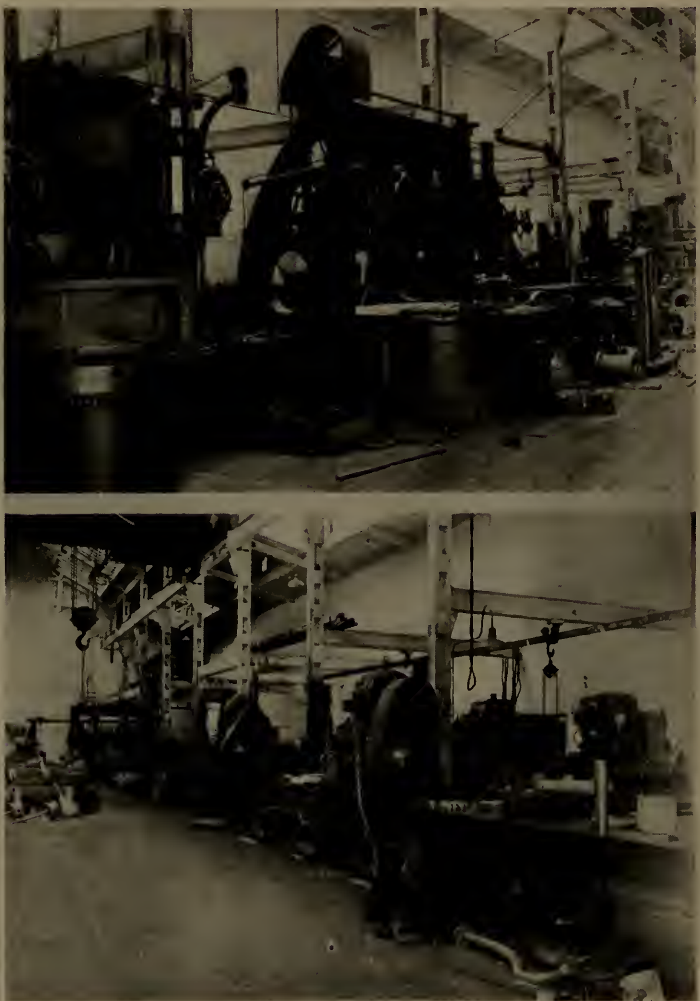
Nome, Alaska, is abolished as a port of entry by presidential order, effective this date.

Special Tools

are Required for Overhaul and Maintenance of

Ship Equipment

Marine Jobs Call for Knowledge of Engine and Auxiliary Functions



Figs. 1 and 2: Views in plant of United Engineering Co., Ltd., San Francisco.

Conspicuous among the group of marine repair shops for which the San Francisco Bay area is noted is that of the United Engineering Company, Ltd., with headquarters and plant at the corner of Steuart and Folsom Streets, San Francisco.

This firm's acquaintance with the marine and allied industries of the district and the familiarity of its personnel with the requirements of ships' machinery and auxiliary equipment, coupled with the adequacy of its shop tools and appurtenances, have enabled it to secure and execute most important contracts pertaining to overhauling and maintenance operations in the marine field, and to handle various lines of machine work of a more general character as well.

One view in the plant, looking from the Steuart Street entrance, is reproduced in the half tone, Fig. 1. In the immediate foreground and at the left are two large extension vertical boring mills of 10 feet capacity. This view, like Fig. 2, also conveys an idea of the arrangement of overhead cranes and of the individual jib cranes and trolleys for serving the different machine tools, and for enabling the work, regardless of size and weight, to be handled with minimum of effort and time loss when placing in position for machining or when removing completed jobs from lathes, planers, boring mills, or other tools.

● A Big Pump Casing Job.

Among other photographs recently made at this plant are two views in Figs. 3 and 4 of a pair of pump castings supplied to the firm by the Paci-

Fig. 5, left: Turning casting in Monarch lathe. This cylinder is cut into piston rings after machining inside and out. Fig. 6, right: Interesting application of Duall contour sawing machine.

fic Foundry Company, Ltd., of San Francisco. These castings are for a circulating pump for the McCormick Line's Sidney M. Hauptman, a vessel of approximately 8,000 tons powered by triple expansion engines of 2,500 horsepower.

The upper half of the pump casing weighs 1630 lbs., the lower half 3580 lbs. The castings are high test, close grained iron of 35,000 to 37,000 lbs. tensile strength without addition of alloys. These castings, like all produced by Pacific Foundry, are made under metallurgical control, including chemical analysis and physical control by breaking of test bars in most modern testing machines.

In Fig. 3 one half of the casing is shown lying on the shop floor ready for laying out of the flange holes for

(Page 60, Please)

Figs. 3 and 4. Two views of heavy castings for circulating pump for steamship.

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

Third Set of Bids Opened on U.S. Lines' Passenger Liner

Bids for the construction of a model, safety and fireproof liner to operate on the old run of the Leviathan in the North Atlantic service were opened September 15 by the U. S. Maritime Commission in behalf of the United States Lines Company of New York City, which will operate the vessel.

There were three bidders. In accordance with the terms of the Commission's invitations, each of the three bidders submitted tenders on both a fixed price and an adjusted price basis. The adjusted price basis allows for the adjustment of the final cost of the vessel on account of changes in the cost of labor and materials which may occur during the course of construction, providing any resultant increase or decrease in such labor and material costs do not exceed 15 per cent.

The lowest bids were submitted by the Newport News Shipbuilding and Drydock Company of Newport News, Va., which bid $17,500,000 on a fixed price basis, and $15,750,000 on an adjusted price basis.

Other bidders were:

New York Shipbuilding Corporation of Camden, N. J. Fixed price, $21,308,000; adjusted price, $19,491,000.

Bethlehem Shipbuilding Corporation of New York City, with yards at Quincy, Mass. Fixed price, $21,947,000; adjusted price, $20,705,000.

Several unusual features appear in these bids:

1. There is a very wide divergence in the figures quoted. The two high bids are 25 per cent and 30 per cent higher than the low bid.

2. The low bid on an adjusted price basis is very close, within 5 per cent of the 15 million dollar estimate made by the Maritime Commission experts.

3. All three bidders seem confident that the increase in costs during the life of the contract will be well within the 15 per cent limit set by the Commission experts. It would certainly appear in the face of these figures that this long awaited contract should now be promptly awarded.

The liner plans and specifications on which these bids were called define a vessel of the following general characteristics:

Length	723 feet
Beam molded	92 feet
Depth molded	75 feet
Displacement loaded	34,000 tons
Speed	22 knots
Passenger capacity	1,200
Crew	630

The contractor must agree to finish the job in 852 days elapsed time. The vessel is to be subdivided for a 3 compartment stability standard. Any 3 compartments may be flooded without endangering stability.

Lifeboat facilities provide a seat for every passenger and every crew member, and most of the boats will be motor propelled and radio equipped.

She will be built under the construction-differential subsidy provisions of Title V of the 1936 Merchant Marine Act. Practically every state in the Union will participate in some measure in the construction and/or equipment of this liner.

Sun Lays Two Keels—Launches One Tanker

On September 20 the Sun Shipbuilding and Dry Dock Company laid the keel for a hull (Yard Number

170) for a 12,900 deadweight ton capacity oil tanker. This vessel is being built for the Bernuth, Lembcke Company of New York, and will be 462 feet 4 inches long by 65 feet beam by 35 feet depth. She will be propelled by a single screw driven by a reduction geared steam turbine.

This was the second keel laying in September at this yard. On September 1 they laid the keel for Hull 168, an 18,300 deadweight ton tanker for the Sun Oil Company. This giant will be 542 feet 5 inches long by 70 feet beam by 40 feet depth, and will be powered by a Sun Doxford diesel engine.

On September 26 Sun launched Hull Number 164, first of two single screw steam tankers for the Standard Oil Company of New Jersey. These tankers are 12,900 deadweight ton capacity and are of the same general characteristics as Hull Number 170, described above. Hull 164 will be delivered on October 16 next.

Tanker to be Launched at Sparrows Point

The Sparrows Point Plant of the Bethlehem Shipbuilding Corporation Ltd. has set October 9 as the launching date for the first of the two tankers building there for the Gulf Oil Corporation. These tankers are each to be 425 feet long by 64 feet beam by 34 feet depth, and each has a gross measurement of 7,070 tons.

Union Iron Works Delivers Dredger

The shallow draft seagoing hopper dredge Pacific, after passing all tests with flying colors, was delivered on September 20 to the U. S. Army Engineers by the Union Plant of the Bethlehem Shipbuilding Corporation Ltd., the first seagoing craft turned out by this famous yard in over six years. The Pacific is of a very special type, with a number of features that are new. The requirements of the U. S. Army Engineers are very drastic and are rigidly enforced. Union Plant is to be congratulated for producing a very fine job, which combines hull, machinery, and equipment into one smoothly functioning unit.

Fore River Launches Dredge

At the Fore River Plant of the Bethlehem Shipbuilding Corporation Ltd. on September 23 there was launched the U. S. Engineers dredge General Goethals. This craft is of the seagoing hopper type with 5,000 cubic yards capacity, and is said to be the largest dredge of its type built in America.

Welded Steel Oil Delivery Barge

Jakobson and Peterson Inc., Brooklyn, New York, report that they have been awarded a contract for the construction of an all welded steel self-propelled barge for the Socony Vacuum Oil Company. This barge will be used for harbor deliveries of diesel oil in bulk. It is to be 55 feet long by 13 feet 6 inches beam by 7 feet depth, and will be powered with a 60 shaft horsepower Model 36-A Fairbanks-Morse diesel engine fitted with a 3 to 1 reduction gear.

Manitowoc Ship Launches Tanker

A single screw all welded steel oil tank steamer for the Standard Oil Company of Indiana was launched September 18 by the Manitowoc Ship Building Company of Manitowoc, Wisconsin. This bulk oil carrier is to be used on the Great Lakes trades. She is 465 feet long by 55 feet beam by 28 feet depth, and will carry 2,700,000 gallons of oil. Her power plant will consist of two Scotch marine boilers and a 2,500 shaft horsepower triple expansion condensing steam engine.

Cruiser Launched at Brooklyn

At the Brooklyn Navy Yard on August 26 the 10,000 ton cruiser C. L. 48 was launched and christened Honolulu. Three of this so-called light cruiser class are building at Brooklyn. C. L. 40, the Brooklyn, is nearing completion and is due for delivery on November 1, 1937. C. L. 50, the Helena, had her keel laid in December last year is due for delivery in May, 1939. The Honolulu is expected to be ready for commission about May 1, 1938.

Maritime Commission Offers Old Vessels

The United States Maritime Commission invited bids on September 20th for the purchase on an "as is, where is" basis of 25 steel cargo vessels in its laid-up fleet. The following eighteen of these vessels are tied up at Staten Island, N.Y.:

Name of Vessel	D.W.T.
Anaconda	9808
Arcturus	9601
Arden	8727
Belfort	9781
Bellepline	9786
Bonnie Brook	8727
Cokesit	9426
Commack	8000
Hatteras	7467
Mitchell	8727
Namasket	9632
Oakspring	9371
Quittacas	7690
Vittorio Emmanuele III.	7382
Western King	8643
Western Scout	8422
Yalza	8727

These seven are at Norfolk, Va.:

Kittegaun	8756
Rockport	8611
Wathena	8756
West Galeta	8476
West View	8618
West Zucker	8432
West Zula	8388
Yosemite	9410

Bids will be opened at noon, Wednesday, October 20, in the Commission's offices at Washington.

These vessels, all of which were built by the Government either during or immediately after the World War, are being offered for sale by the Commission for either restricted operation or scrapping, with the requirement that bidders must furnish a stiff performance bond for each vessel.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401);** completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $3,675,000.

Hull 5359, Pacific; seagoing hopper dredge for U. S. Engineers; launched July 28, 1937; delivered September, 1937.

DRYDOCK AND ROUTINE REPAIRS: M.S. Oregon Express, Wallingford, Calmar, Santa Rosa, Barge Bay Gull, F. H. Hillman, Chiriqui, Richmond, Lurline, Honomu, Haviside Barge No. 4, M. S. Silverbelle, Talamanca, D. G. Scofield, H. M. Storey, M. S. Hoegh Merchant, Santa Paula, Antigua, Yacht Invader, Charcas, President Wilson, Portmar, President Garfield, M. S. Silvermaple, Santa Elena.

FELLOWS & STEWART, INC.
Wilmington, Calif.

DRYDOCK AND ROUTINE REPAIRS: Yachts Cheerio, Content, and Blue Peter; Dauntless, Vittorio, Western Spirit; 50 smaller yachts and fishing boats.

GENERAL ENGINEERING & DRY DOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Fireboat Dennis T. Sullivan, Gas. S. St. Mary, Elna, Noyo, Tug Arabs, Ryder Hanify, Gas. S. Sea Queen, Hoquiam, Derrick Barge, Lumberman.

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats;** 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; estimated launching dates September 11, October 2, 16 and 30; estimated completion dates October 1 and 25, November 10 and 20, 1937.

Two 78'x20'x9'6" Lamparo fishing boats; one for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; second for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. Estimated launching dates September 4 and 18; estimated completion dates October 2 and 16, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: President Taft, Hamakua, Hwa Dah, Anniston City, Mobile City, Golden Cloud, Titanian, U.S.C.G.C. Tiger, Ferry Manuwai.

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: Tug Pioneer.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

NEW CONSTRUCTION: **Hull No. 57,** one steel harbor barge 139' x 40' x 14'; 8,200 bbl. capacity; for General Petroleum Corp. of Calif. Delivery date, January, 1938.

DRYDOCK AND ROUTINE REPAIRS: Golden Peak, Golden Sun, Tug Louie Black, M.S. Delftdyk, Coast Farmer, La Purisima, Lebec, Heina, Cathwood, F/B Romancia, Yachts Enchantress and Velero II, W.T. Derrick Barge No. 4, W.T. Barges Nos. 14, 16 and 17; Tug Capt. Williams.

MARE ISLAND NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION:

Henley (DD391) destroyer; standard displacement 1500 tons; keel laid October 28, 1935; launched January 12, 1937; estimated delivery date October, 1937.

Pompano (SS181) submarine; keel laid January 14, 1936; launched March 11, 1937; estimated delivery date October, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: Houston, Trenton, Richmond, Dobbin, Bushnell, Partridge.

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Mevania, Balboa, Frances, Patterson, Manoa, Kailu, Portland, Nebraskan, Leslie J. Fulton, Floridian, Tug A. H. Payson, Buenos Aires, Bengalin, Santacruzcement, Missourian, West. Pac. Barge No. 1, Nevadan, San Rafael, Shoshone, Sobre Los Olas, John R, Arkansan, Blue Water, Chicago, California Rose, Vancouver, General Lee, Western Pilot, Marettimo, American Robin, Robert Luckenbach, Dakotan, Tug Virgil G. Bogue, Elbe, Bainbridge, California Star, Olympic.

PRINCE RUPERT DRYDOCK AND SHIPYARD
Prince Rupert, B.C.

DRYDOCK AND ROUTINE REPAIRS: Four fishing boats, 3 scows, 43 ship repair jobs not requiring docking, 41 commercial jobs.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; estimated completion date, November 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: Nevada, Saratoga, Brazos.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: Barge Mastodon, Pacific Pine, Pacific Hemlock, Robert Luckenbach, Cuzco, Romulus.

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION: **Hull No. 127, Yankee Clipper;** purse seiner, 82' x 20'; 200 H.P. Atlas engine; keel laid

May 26, 1937; launched July 22, 1937; delivered August 28, 1937; owners, Ed. & J. Kaseroff and E. Manaka, of San Pedro, Calif.

Hull No. 129, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 19; launched September 10, 1937; delivery date, October 15, 1937. Owner, Roy Hugiv, Seattle.

DRYDOCK AND ROUTINE REPAIRS: Fishing boats Sonia, Advance, Liberty Girl, Reliance, Excellent; Tugboat Capt. O. G. Olson.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION:

One floating machine shop for C. C. Hunley, Cairo, Ill.; 82' x 20' x 3½'.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Two bulk lake freighters** 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Keels laid June 21, 1937; and July 6, 1937; launching date October, 1937; delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis** and **DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract Sept. 19, 1935. Estimated delivery Dec. 1937, Mar. 1938, and June 1938, respectively, **DD396**, keel laid, Mar. 26, 1936. **DD395**, keel laid July 28, 1936. **DD394**, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and **DD410, Hughes**, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; delivery date April, 1939, and June, 1939, respectively.

Hull No. 175, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, October 1, 1937.

Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; estimated delivery, October 15, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; launched August, 1937; estimated delivery, February, 1938.

Annapolis, West Point, Yale; three diesel drive trawlers for General Sea Foods; keels laid June 17, 1937; launched September 23, 1937; estimated delivery October, 1937.

Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil tankers** steam 425'x64'x34' for Gulf Oil Corp.; total tonnage 7070 each; estimated launching, first ship, October 9, 1937.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

One barge for Socony-Vacuum Oil Co., Inc.; 260 feet long; non-propelled. Estimated delivery date October, 1937.

BOSTON NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; estimated delivery, October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; launching date February 1, 1938; estimated delivery indefinite.

DD415, O'Brien, and DD416, Walke, two destroyers; LBP 341', beam 36', depth 19'8"; delivery dates, August, 1939, and October, 1939, respectively.

Two destroyers of DD 421 Class.

One large harbor tug for U. S. Navy; delivery date 1938.

BROOKLYN NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn**, light cruiser, L.B.P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, November 1, 1937.

CL 48, **Honolulu**, light cruiser; L.B.P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935; launched August 26, 1937; estimated delivery, May 1, 1938.

CL 50, **Helena**, light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

CHARLESTON, S. C., NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for **one harbor tug**; LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'; keel laid August 2, 1937.

Order placed for **one harbor tug**; LOA 110' 3"; LBP 98' 0"; breadth 24' 0"; depth at side amidships 13' 6". No dates set.

Order placed for one **harbor tug**; 65 feet long.

Launch of Paramount recently at Lake Washington Shipyards, Houghton, Washington, was significant as introducing modern welded steel construction into the large fishing boats of the Pacific Coast. Full illustrated description of Paramount will be found in article on page 26 of this issue. With complete equipment, Paramount cost in excess of $200,000.

CHARLESTON SHIPBUILDING & DRYDOCK CO.
Charleston, S.C.

NEW CONSTRUCTION: **Two trawlers** for the Portland Trawling Company; 146'6'x25'x14'2".

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One diesel yacht, powered by 1,000 h.p. Winton engines; 143' long, 23' beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION:

Hulls Nos 1320-1327; two welded flush deck cargo box barges 100'x26' x6'6"; 320 gross tons.

Hulls Nos. 1385 and 1386; two single screw diesel towboats; for stock; 320 gross tons.

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Ship-

(Page 68, please)

Humidity and Ventilation

Some Notes on a Case Involving Conditions of Work in Ships' Laundries and Similar Rooms

By David W. Dickie

The writer has written several articles on the carriage of fruits and perishable cargoes, in which the point was stressed that the carriage of pears, for example, required that some means be adopted to provide humidity in the reefer boxes and wet and dry bulb pyrometers or hygrometers be installed to record the temperature and humidity. We now present an interesting case in which the direct opposite result is sought.

The man in charge, coming out of the linen room on board a passenger and cargo liner, fainted and fell in the passageway near the linen room door. This man, through his attorney, H. W. Hutton, sued the ship, alleging that he was overcome by excessive temperature and vitiated air. Ira S. Lillick and Gilbert C. Wheat defended the ship.

It was discovered subsequently that the thermometer the linen man was using was broken, and while it was not possible to prove it was broken at the time he took the excessive temperature readings, it also was not possible to reproduce his excessive temperatures in the linen room on subsequent voyages when the temperatures outside and in the engine room were higher.

The air supply of the ventilation system was measured and found to be five times the standard amount necessary for school children, which is the highest rating in human requirements.

When the humidity was investigated it was discovered that in places

TEMPERATURE AND HUMIDITY ANALYSIS

Date	Place	Deck: Observed Temperatures Degrees Fahrenheit, Dry	Deck: Wet	Deck: Humidity, Relative Per Cent	Deck: Humidity, Absolute in Grains per Cubic Foot	Deck: Dew Point Temperatures	Theoretical Temperatures	Difference Degrees	Linen Room: Observed Temperatures Degrees Fahrenheit, Dry	Linen Room: Wet	Linen Room: Humidity, Relative Per Cent	Linen Room: Humidity, Absolute in Grains per Cubic Foot	Linen Room: Dew Point Temperatures	Differences Deck and Linen Room: Observed Temperatures Degrees Fahrenheit, Dry	Differences: Wet	Differences: Humidity, Relative Per Cent	Differences: Humidity, Absolute in Grains per Cubic Foot	Differences: Dew Point Degrees	Sea Water Temperatures
JULY 1938		DRY	WET	%	GRAINS	FAHR	FAHR	FAHR	DRY	WET	%	GRAINS	FAHR	DRY	WET	%	GRAINS	FAHR	FAHR
13-10 AM	FROM SAN FRANCISCO TOWARDS HONOLULU	64	60	79	5.185	57	70	+5	73	68	70	6.549	64	+11	+8	-9	+1.364	+7	60
- 2 PM		65	62	85	5.765	60	75	+4	79	70	64	6.785	66	+14	+8	-21	+1.020	+6	64
14-10 AM		71	65	72	5.850	62	81	+2	83	72	58	6.953	67	+12	+7	-14	+1.103	+8	68
- 2 PM		72	62	57	4.850	56	79	+7	86	74	57	7.483	69	+14	+12	0	+2.633	+13	68
15-10 AM		76	69	66	6.372	64	82	+2	84	74	62	7.661	70	+8	+6	-4	+1.288	+6	72
- 2 PM		75	66	62	5.601	61	81	+7	88	77	61	8.301	73	+13	+11	-1	+2.700	+12	73
16-10 AM		78	72	75	7.708	69	86	+2	88	78	64	8.920	74	+10	+6	-11	+1.212	+5	76
- 2 PM		80	73	72	7.873	70	85	+4	89	80	67	9.620	77	+9	+7	-5	+1.747	+7	76
17-10 AM	ARRIVED 7:33 AM HONOLULU SAILED 5:55 PM	82	76	76	8.836	72	89	+1	90	80	65	9.614	76	+8	+4	-11	+0.778	+2	79
- 2 PM		85	76	66	8.406	72	85	+8	97	87	66	11.974	84	+12	+11	0	+3.568	+12	79
18-10 AM		82	74	69	8.022	71	90	+2	92	80	59	9.256	78	+10	+6	-10	+1.234	+5	79
- 2 PM		79	74	79	8.375	72	93	+1	94	80	64	8.982	75	+15	+6	-15	+0.607	+3	79
19-10 AM		82	76	76	8.836	74	92	0	92	80	59	9.256	76	+10	+4	-17	+0.420	+2	77
- 2 PM		75	72	86	8.046	71	88	+4	92	80	59	9.256	76	+17	+8	-27	+1.210	+5	77
20-10 AM		77	70	71	7.079	67	90	+1	91	77	52	7.922	71	+14	+7	-19	+0.843	+4	75
- 2 PM		73	70	86	7.553	69	82	+8	90	81	88	10.057	78	+17	+11	-18	+2.504	+9	75
21-10 AM		74	68	74	6.709	65	82	+4	86	76	63	8.271	72	+12	+8	-11	+1.562	+7	74
- 2 PM		72	68	73	6.211	63	83	+5	88	76	57	7.944	71	+16	+10	-16	+1.733	+8	74
CROSSED INTERNATIONAL MERIDIAN LINE																			
23-10 AM		78	70	74	7.144	67	87	+1	88	76	57	7.944	71	+12	+8	-17	+0.800	+4	73
- 2 PM		76	72	82	7.917	70	84	+8	92	83	68	10.688	80	+16	+11	-14	+2.751	+10	74
24-10 AM		79	76	87	9.223	73	90	+8	96	85	63	11.105	82	+17	+9	-24	+1.882	+7	77
- 2 PM		79	74	79	8.375	72	84	+11	95	87	72	12.330	85	+15	+13	-7	+3.955	+13	77
25-10 AM	ARRIVED 8:16 AM YOKAHAMA SAILED 8:30 PM	74	69	78	7.071	67	81	+4	85	78	68	8.406	72	+11	+7	-12	+1.335	+5	75
- 2 PM		72	67	77	6.551	64	82	+5	87	76	60	8.118	72	+15	+9	-17	+1.564	+8	74
26-10 AM		77	71	74	7.371	68	91	-1	90	76	52	7.691	70	+13	+5	-22	+0.364	+2	75
- 2 PM		81	71	61	8.870	66	85	+5	94	83	63	10.475	75	+13	+12	+2	5.601	+13	75
27-10 AM	ARRIVED 1:10 PM KOBE SAILED 10:00 PM	84	76	69	8.916	73	92	+2	84	82	60	9.940	78	+10	+6	-9	+1.456	+5	77
- 2 PM		84	77	73	9.020	74	94	-2	92	80	59	9.256	78	+8	+3	-4	+0.236	+2	77
28-10 AM		80	77	87	9.512	76	91	+3	94	85	63	10.479	79	+14	+8	-24	+0.967	+3	72
- 2 PM		84	79	80	9.889	77	88	+6	94	87	75	12.478	85	+10	+8	-3	+2.591	+8	72
29-10 AM	ARRIVED 3:40 PM SHANGHAI SAILED 8:21 AM	88	84	52	12.077	83	96	-2	84	88	85	11.477	82	+8	+1	-23	-0.600	-1	85
- 2 PM		90	90	65	9.614	76	89	+4	93	86	75	12.116	84	+3	+8	+10	+2.502	+8	85
30-10 AM		88	80	70	9.758	77	89	+5	100	88	62	12.255	85	+12	+8	-8	+2.499	+8	84
- 2 PM		86	75	73	9.993	76	89	+8	87	88	73	13.243	87	+11	+10	0	+3.660	+11	82
31-10 AM		80	78	91	9.550	77	90	+8	98	88	67	12.510	85	+18	+10	-24	+2.580	+8	78
- 2 PM		81	78	87	9.809	77	81	+3	94	84	66	10.978	81	+13	+6	-21	+1.169	+4	79
AUGUST 1938																			
1-10 AM	ARRIVED 2:08 AM HONG KONG SAILED 9:01 PM	84	80	84	10.278	79	94	-2	92	82	65	10.197	79	+8	+2	-18	+0.182	0	78
- 2 PM		88	81	74	10.314	78	96	-1	95	84	63	10.788	80	+7	+3	-11	+0.474	+1	79
2-10 AM		83	78	84	10.070	78	92	+3	95	86	66	11.301	82	+12	+8	-18	+1.231	+4	83
- 2 PM		81	79	87	9.809	78	85	+7	98	88	73	12.807	86	+15	+9	-14	+3.058	+8	83
3-10 AM	ARRIVED 8:30 AM MANILLA	85	78	73	9.297	75	93	-1	92	81	62	9.727	77	+7	+3	-11	+0.430	+2	82
- 2 PM		81	76	75	8.907	74	84	+4	88	82	77	10.732	80	+7	+6	-2	+1.823	+8	82
4-10 AM		78	75	86	9.269	75	87	+6	92	83	68	10.668	80	+16	+8	-20	+1.399	+5	82
- 2 PM		77	78	96	9.864	76	85	+5	90	83	74	10.345	81	+13	+7	-22	+1.381	+6	82
5-10 AM		82	78	88	10.231	78	95	+1	96	84	61	10.752	80	+14	+6	-27	+0.521	+2	82
- 2 PM		83	78	80	9.590	76	89	+1	90	82	71	10.501	79	+7	+4	-9	+0.911	+3	85
6-10 AM		87	79	70	9.498	78	95	+1	96	84	61	10.732	80	+9	+5	-9	+1.264	+4	82
- 2 PM		89	81	70	10.051	78	96	-1	95	84	63	10.788	80	+8	+3	-7	+0.737	+2	82
7-10 AM	SAILED 3:48 PM MANILLA	86	81	81	10.633	79	96	-1	95	84	63	10.788	80	+9	+3	-18	+0.155	+1	82
- 2 PM		86	81	81	10.633	79	96	-1	95	84	63	10.788	80	+9	+3	-18	+0.155	+1	82
8-10 AM		86	82	84	11.027	81	88	-2	96	84	61	10.752	80	+10	+2	-23	-0.275	-1	82
- 2 PM		85	81	84	10.690	80	93	0	93	88	68	10.985	81	+8	+3	-16	+0.287	+1	82
9-10 AM	ARRIVED 7:47 AM HONG KONG SAILED 8:40 AM	81	79	91	10.261	78	93	-1	92	82	65	10.197	79	+11	+3	-26	-0.064	+1	81
- 2 PM		83	81	98	11.028	80	94	-2	94	83	63	10.479	79	+11	+2	-29	-0.549	-1	79
10-10 AM		83	80	88	10.549	79	92	+1	93	84	68	10.985	81	+10	+4	-20	+0.436	+2	77
- 2 PM		81	80	96	10.825	80	93	+3	96	86	66	11.634	83	+15	+6	-30	+0.809	+3	76
11-10 AM		85	82	86	11.204	81	95	+1	96	86	66	11.634	83	+11	+4	-22	+0.426	+2	80
- 2 PM		88	82	77	10.732	80	94	+3	97	88	69	12.518	85	+9	+6	-8	+1.786	+5	81
12-10 AM	ARRIVED 11:42 AM SHANGHAI SAILED 7:17 AM	90	84	78	11.536	82	99	-2	97	88	63	11.429	83	+7	+2	-15	-0.107	+1	81
- 2 PM		91	82	68	10.350	79	91	+5	96	89	76	13.386	87	+5	+7	+8	+3.037	+8	81
13-10 AM		76	77	86	9.866	77	89	+2	91	82	88	10.359	79	+13	+5	-28	+0.493	+2	82
- 2 PM		83	82	96	11.507	82	94	-1	93	84	68	10.985	81	+10	+2	-28	-0.522	-1	82
14-10 AM	ARRIVED 8:12 AM KOBE SAILED 3:59 PM	83	74	65	7.781	70	88	+7	95	84	63	10.788	80	+12	+10	-2	+2.957	+10	81
- 2 PM		82	78	76	8.836	74	84	+8	92	84	72	11.296	81	+10	+8	-4	+2.460	+7	81
15-10 AM		78	74	79	8.379	72	91	-3	88	76	57	7.944	71	+9	+2	-22	-0.431	-1	79
- 2 PM		80	74	75	8.201	72	85	+1	88	78	70	9.189	79	+8	+4	-5	+0.988	+3	80
16-10 AM	ARRIVED 11:14 AM YOKAHAMA SAILED 8:11 PM	72	69	82	6.976	66	83	+7	90	79	61	9.022	75	+18	+11	-21	+2.046	+9	78
- 2 PM		68	65	85	6.658	64	74	+11	86	78	73	9.297	75	+19	+13	-28	+2.639	+11	77
17-10 AM		78	75	79	8.115	71	88	+3	91	80	61	9.291	78	+13	+7	-18	+1.173	+5	77
- 2 PM		83	75	89	8.271	72	91	+2	93	81	55	9.532	77	+10	+6	-10	+1.261	+5	78
18-10 AM		78	77	96	9.866	77	85	+5	92	83	66	10.668	80	+14	+8	-28	+0.802	+3	78
- 2 PM		79	77	91	9.647	76	87	+5	92	84	72	11.296	81	+13	+7	-19	+1.648	+5	79
19-10 AM		78	75	79	8.119	71	83	+8	92	84	72	11.296	81	+14	+11	-7	+3.177	+10	77
- 2 PM		81	74	72	8.118	71	82	+9	91	85	78	11.883	83	+10	+11	+6	+3.765	+12	78
20-10 AM		77	71	74	7.372	68	86	+5	91	80	61	9.292	76	+14	+9	-13	+1.920	+8	77
- 2 PM		78	72	75	7.708	65	79	+11	90	84	78	11.538	82	+12	+12	+3	+3.828	+13	78
CROSSED INTERNATIONAL MERIDIAN LINE															David W. Dickie				
20-10 AM		78	73	75	8.119	71	85	+7	92	83	68	10.668	80	+14	+10	-11	+2.549	+9	78
- 2 PM		80	72	68	7.435	68	81	+9	90	83	74	10.945	81	+10	+11	+6	+3.510	+13	78
21-10 AM		78	73	78	8.119	71	88	+4	92	81	82	9.727	77	+14	+8	-17	+1.608	+6	78
- 2 PM		79	72	71	7.827	68	81	+10	91	84	74	11.273	82	+12	+12	+3	+3.748	+13	75
22-10 AM		82	73	85	7.667	68	84	+5	98	84	82	10.018	78	+11	+9	-3	+2.459	+9	79
- 2 PM		80	71	64	6.887	67	84	+8	92	82	65	10.197	79	+12	+11	+1	+3.200	+12	80
23-10 AM	ARRIVED 9:26 AM HONOLULU SAILED 12:01 AM	78	73	79	8.118	71	91	+8	93	80	66	9.047	75	+15	+7	-26	+0.928	+4	80
- 2 PM		81	73	68	7.687	70	89	+9	92	84	72	11.288	81	+11	+11	+4	+3.623	+11	80
24-10 AM		78	72	75	7.708	69	82	0	92	78	53	8.319	73	+14	+6	-22	+0.607	+4	78
- 2 PM		77	72	79	7.870	70	88	+8	91	78	58	8.938	75	+14	+7	-21	+0.968	+5	78
25-10 AM		77	65	67	6.674	65	85	+8	91	78	68	8.838	75	+14	+10	-8	+2.182	+10	79
- 2 PM		74	66	74	6.709	66	83	+6	89	78	81	8.759	74	+13	+10	-13	+2.050	+9	74
26-10 AM		72	67	77	6.528	64	84	+4	88	78	57	7.944	71	+18	+9	-20	+1.393	+7	71
- 2 PM		71	64	66	6.950	59	76	+11	87	78	80	8.848	75	+13	+14	+1	+3.398	+16	71
27-10 AM	TOWARDS SAN FRANCISCO	67	62	75	5.431	58	79	+6	89	75	56	7.138	68	+18	+12	-18	+1.701	+9	67
- 2 PM		71	65	64	5.274	64	73	+10	83	76	72	8.031	73	+12	+13	+8	+3.357	+15	68

TABLE I

like the China coast and the Panama Canal the outside air is so humid that the ventilation system aggravates the situation by adding moisture to air that is already overburdened with water, so that increasing the air change would be beneficial only at places where the humidity of the outside air is lower than that of the air inside the room. The Pacific Coast affords an example of such conditions. The question of generating drafts by increase of air change would also require investigation.

Here again the ship should not be held at fault. An examination of Table 1 shows that actually there were days on the China coast when there were less grains of water per cubic foot in the linen room than there were in the air outside.

In Table 1 the wet and dry bulb temperatures for deck and linen room and the temperatures of sea water are actual observations. The other columns are calculated. On August 9 at 2 p.m. the linen room had a temperature of 94 degrees Fahrenheit dry bulb and 83 degrees wet bulb. The relative humidity for (t—t'=11) is 63 per cent. The number of grains of water per cubic foot of 94 degree aqueous vapor at the saturation point is 16.634 grains. With a relative humidity of 63 per cent the air carries 10.479 grains of water. The temperature of the dew point for air at 94 degrees Fahrenheit and (t—t'=11) is 79 degrees.

On the same day the outside temperature was 83 degrees Fahrenheit dry bulb and 81 degrees wet bulb. With (t—t'=2) the relative humidity is 92 per cent. The weight of water per cubic foot of 83 degree Fahrenheit aqueous vapor at the saturation point is 11.987 grains. With a relative humidity of 92 per cent the air carries 11.028 grains of water. The temperature of the dew point for air at 83 degrees Fahrenheit and (t—t'=2) is 80 degrees.

These results are obtained from the Weather Bureau Psychrometric Tables for sea level or 30 inches barometric pressure.

● Mere Ventilation Not Enough.

With 1085 cubic feet of fresh air coming into the laundry and linen room every minute through the ventilation system, and 2030 cubic feet of moist air going out through the exhaust system, the presence of so much excess moisture seems to indicate that it requires more than mere ventilation to alleviate the condition.

An approximation of the difference between the natural air temperature of the linen room and what may be described as the artificial temperature therein caused by local conditions can be obtained by using the following principle: The lowest saturation temperature that can be obtained in the rooms where there is no dehumidification is the same as the outside wet bulb temperature. In that case the dew point in the rooms will always be the same as the outside wet bulb temperature.

Table 2 was calculated from the Meteorological Tables of the Smithsonian Institution by making the outside wet bulb temperature in the left-hand column the same as the dew point in the room for the various humidities at the top of the table. The column captioned "linen room," "Theoretical Temperatures" in Table 1 is taken from Table 2. The difference between the actual linen room temperatures and the theoretical linen room temperatures, where the former are higher, represents the difference in temperature in the

TABLE 2

ROOM TEMPERATURES IN DEGREES FAHRENHEIT AT VARIOUS OUTSIDE WET BULB TEMPERATURES AND VARIOUS PERCENTAGES OF HUMIDITY IN THE ROOM

OUTSIDE WET BULB TEMPERATURE DEGR. FAHR.	PERCENTAGE OF HUMIDITY IN ROOM																				
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90
50	69.4	68.3	67.2	66.1	65.1	64.1	63.2	62.3	61.4	60.6	59.8	59.0	58.2	57.5	56.8	56.1	55.4	54.7	54.1	53.6	52.9
52	71.4	70.6	69.3	68.2	67.3	66.3	65.3	64.4	63.5	62.7	61.9	61.1	60.3	59.6	58.9	58.1	57.4	56.8	56.1	55.5	54.5
54	73.8	72.8	71.5	70.4	69.4	68.4	67.6	66.5	65.7	64.8	64.0	63.2	62.4	61.6	60.9	60.2	59.6	58.8	58.2	57.6	56.9
56	76.0	74.8	73.7	72.6	71.6	70.6	69.6	68.7	67.8	66.9	66.1	65.3	64.5	63.7	63.0	62.2	61.5	60.9	60.3	59.5	58.9
58	78.1	77.0	75.8	74.7	73.7	72.7	71.7	70.8	69.9	69.0	68.2	67.3	66.5	65.8	65.0	64.3	63.6	62.9	62.2	61.6	60.9
60	80.3	79.1	78.0	76.9	75.8	74.8	73.8	72.9	72.0	71.1	70.3	69.4	68.6	67.8	67.1	66.4	65.6	64.9	64.3	63.6	63.0
62	82.5	81.3	80.2	79.1	78.0	77.0	76.0	75.0	74.1	73.2	72.3	71.5	70.7	69.9	69.1	68.4	67.7	67.0	66.3	65.6	65.0
64	84.7	83.5	82.3	81.2	80.1	79.1	78.1	77.1	76.2	75.3	74.4	73.6	72.8	72.0	71.2	70.5	69.7	69.0	68.4	67.7	67.0
66	86.9	85.7	84.5	83.4	82.3	81.2	80.2	79.2	78.3	77.4	76.5	75.7	74.9	74.1	73.3	72.5	71.8	71.1	70.4	69.7	69.1
68	89.1	87.9	86.7	85.5	84.4	83.4	82.3	81.4	80.4	79.5	78.6	77.8	76.9	76.1	75.3	74.6	73.8	73.1	72.4	71.7	71.1
70	91.3	90.0	88.9	87.7	86.6	85.5	84.5	83.5	82.5	81.6	80.7	79.8	79.0	78.2	77.4	76.6	75.9	75.2	74.5	73.8	73.1
72	93.6	92.3	91.0	89.8	88.7	87.6	86.6	85.6	84.6	83.7	82.8	81.9	81.1	80.3	79.5	78.7	77.9	77.2	76.5	75.8	75.1
74	95.7	94.4	93.2	92.0	90.9	89.8	88.7	87.7	86.7	85.8	84.9	84.0	83.1	82.3	81.5	80.6	79.9	79.1	78.3	77.6	76.9
76	97.9	96.6	95.3	94.1	93.0	91.9	90.8	89.8	88.8	87.9	87.0	86.1	85.3	84.4	83.6	82.8	82.1	81.3	80.6	79.9	79.1
78	100.0	98.7	97.5	96.3	95.1	94.0	92.9	91.9	91.0	90.0	89.1	88.2	87.3	86.5	85.7	84.9	84.1	83.4	82.6	81.9	81.2
80	102.2	100.9	99.7	98.4	97.3	96.2	95.1	94.1	93.1	92.1	91.2	90.3	89.4	88.6	87.7	86.9	86.2	85.4	84.7	83.9	83.2
82	104.4	103.1	101.8	100.6	99.4	98.3	97.2	96.2	95.2	94.2	93.3	92.4	91.5	90.6	89.8	89.0	88.2	87.4	86.7	86.0	85.3
84	106.6	105.3	104.0	102.8	101.6	100.5	99.4	98.3	97.3	96.3	95.4	94.4	93.6	92.7	91.8	91.0	90.3	89.5	88.7	88.0	87.3
86	108.8	107.4	106.1	104.9	103.7	102.6	101.5	100.4	99.4	98.4	97.5	96.5	95.6	94.8	93.9	93.1	92.3	91.5	90.8	90.0	89.3
88	111.0	109.6	108.3	107.1	105.9	104.7	103.6	102.5	101.5	100.5	99.5	98.6	97.7	96.8	96.0	95.1	94.4	93.6	92.8	92.1	91.4
90	113.2	111.8	110.5	109.2	108.0	106.8	105.7	104.7	103.6	102.6	101.6	100.7	99.8	98.9	98.0	97.2	96.4	95.6	94.9	94.1	93.4

linen room that might be attributed to radiation within the ship and similar local causes.

On the same day the theoretical temperature of the air in the linen room (with an outside wet bulb temperature of 81 degrees Fahrenheit and a relative humidity in the room of 63 per cent) was 96 degrees, so the actual temperature was two degrees lower than the theoretical, proving that the ventilating system is doing all that can be accomplished by merely changing air, and indicating further that some other method must be used if it is desired to modify the humidity.

The actual moisture in the linen room was 0.549 of a grain per cubic foot less than that in the outside air. Also the dew point in the linen room was one degree Fahrenheit lower than that of the outside air.

Note that the condition where the actual temperatures are lower than the theoretical temperatures occurs at or near the time that the number of grains of water per cubic foot in the linen room are less than the grains per cubic foot in the outside air, which is to be expected, largely because the incoming moisture requires heat to raise its temperature to that of the linen room. This heat is removed from the air in the linen room, thereby reducing its temperature slightly. As the temperature reduction in the linen room only amounts to from one to three degrees it is insufficient to be of much benefit.

To operate a laundry at all it is necessary to have heat, and a person to work therein must be inured to it just as a blacksmith must be physically constituted to bear without discomfort the heat emanating from the hot metal; but the laundry machinery will be much more efficient and the linen will be ironed faster if the air is dry so the moisture from the drying linen can be carried off readily.

Evaporation From Laundry Machinery.

The average weight of water per cubic foot of air throughout the entire voyage is: Of air from the outside, 8.473 grains; and of air within the linen room, 10.069 grains. The average difference in grains per cubic foot between the linen room and the outside air is 1.596 grains. There are 7000 grains in one pound and 437.5 grains in one ounce. At 1.596 grains per cubic foot there are 130 pounds of water exhuding from the operation of the laundering machinery every 24 hours.

The right-hand column of Table 1 gives the sea temperature in degrees Fahrenheit, which average for the voyage 6.73 degrees higher than the dew point of the outside air. Here again the only place in the voyage where the dew point of the outside air is higher than the sea temperature is on the China coast, which is a further indication that the weather condition of that coast is a difficult problem to contend with.

For the Deck Officers

(Continued from Page 33)

3700 miles, and there were times that the speed of that vessel was recorded as 18 knots. There were others of this Clipper period that were credited with speeds in excess of 18 knots for short periods. Having gone through the gold rush of California, the short-lived Clipper ship era was threatened by that new method of ocean transportation, the steam vessel.

This short sketch of the sailing vessel period from 1800-1860 was done merely to show the ability of American shipbuilders and seamen, and to instil pride in the minds of present-day officers for the foundation and heritage of our present American Merchant Marine. It is hoped that the ship of today and tomorrw will increase in efficiency in the same ratio that our sailing vessels did until they became obsolete, through the demand for greater carrying capacities and more certain schedules, which demand could only be filled by steamships.

The seamen and officers of American vessels are as efficient as those of any country in the world, and are to be complimented on their accomplishments.

It is our greatest desire that through this column the equipment, apparatus and other factors pertaining to American ship operation may be discussed in a way that will benefit all our readers and will tend to improve the knowledge and efficiency of the American licensed merchant marine officer. We hope with the help of the licensed personnel to build up the prestige of the present American Merchant Marine so that it shall be a worthy foundation upon which future generations of navigators in this and other countries may be proud to build.

Running Lights of Pacific Shipping

● Shipbuilder

Joseph A. Moore, president Moore Dry Dock Company of Oakland, Calif. His shipbuilding skill recognized universally, he has countless friends in England, Scotland, Atlantic seaboard. Motivating factor of Bohemian Club. His hobby FRIENDS!

Ship Operator ●

Roger D. Lapham, president for 31 years of American-Hawaiian Steamship Company . . . took two years away from the "helm" to serve as captain of the famous 77th Division overseas . . . as Food Administrator in London. Ardent traveler via dirigible, China Clipper, and ocean liner. Hobbies—golf, fishing.

● Marine Underwriter

Charles R. Page, president of Fireman's Fund Insurance Company, genuine San Franciscan by birth and career. Joined F. F. marine department upon graduation from Yale. His intimate knowledge of ships and shipping brought him appointment by President Wilson as Commissioner of the U. S. S. B.; trustee of the E. M. F. Civic minded, he serves S. F. Chamber of Commerce — U. S. C. of C — Community Chest.

Safety Engineer ●

Capt. Stanley E. Allen, for quarter century marine department Standard Oil Company of California . . . through the deck department of his company's tankships . . . now serves as Safety and Fire Prevention Engineer out of the busy 14th floor department headed by Joseph McEachern and Charles Robertson. Spark plug of Propeller Club of California, he has been Secretary under ten administrations.

● Shipping Board Graduate

Edward C. Mausshardt, district representative, Pacific Coast District, U.S. Maritime Commission. For fourteen years engineering department of old Pacific Coast S. S. Co. . . . and Oceanic. Since 1919, executive work with Shipping Board and, in turn, the Maritime Commission. Soldiered in the Spanish-American fracas. The crack of the baseball bat is music to his ears. Motors to California's historic spots whenever leisure from his duties permits.

G. P. A. ●

Clay Hutchison, general passenger agent of the Grace Line . . . since December, 1917. Formerly with Southern Pacific Company. A native son, born in Fresno. Member of San Francisco Commercial Club and the F. and A. M. Hobbies: Hunting, fishing . . . signing up passengers for "Santa" ships.

Propeller Club of California Holds September Meets

Capt. Walter J. Peterson brought Propeller Club members up to date on happenings affecting marine legislation at the last session of Congress, speaking at our fall inaugural meeting, September 14.

Detailing the various bills discussed, enacted or "tabled," guest-speaker Peterson told his audience of some of the dangerous measures proposed by idealists, who have little conception of practical 'board-ship problems.

His hearers were admonished to exert every influence to send marine-minded men to represent them in Washington. "Remember, we are the ones who vote into power the men who have the future of the American merchant marine in their hands," he stated. The speaker was warmly acclaimed for a masterly talk.

Chairman of the day was William Laughton, superintendent of Bethlehem Shipbuilding Corp., Union Plant.

C. Y. Kwong, chancellor of the Chinese Consulate in San Francisco, spoke at the September 28 meeting on the timely subject, "What Is China Fighting For?"

Mr. Kwong, an American-educated Chinese, proved an absorbing speaker. He very wisely adapted his remarks to his audience of men interested in commercial relations with China, pointing out that a tremendous market for American exports is now at stake. A veritable ovation was accorded the speaker at the conclusion of his appeal for understanding of the Chinese cause.

Presiding at this meeting was vice-president C. M. "Dad" Le Count, who kept the good ship on schedule during a many-featured program. Chairman of the day Russell T. Pratt, vice-president of General Machinery and Supply Co., introduced the speakers and, incidentally, maneuvered a few bows from members in attendance who have been on the A. W. O. L. list.

● Acknowledgment.

Members and their friends appreciated the musical divertissement at the September 14 meeting. Florence McMillan, the charming daughter of Captain Cal McMillan of the Coast Guard, sang a group of our favorites, accompanied at the piano by Phyllis Martin, lovely daughter of Propeller W. Edgar Martin.

● Wedding Bells.

Our handsome president, Edward T. Harms, has embarked on the sea of matrimony (if we must be nautical!) The news came out with a bang at the September 28 luncheon when vice-president Le Count explained why he was substituting. Good luck to you, Skipper, and to your First Mate.

● Keel Club.

Several members of the Propeller crew recently attended a dinner-meeting of the Keel Club of the California Nautical Schoolship, at which Capt. W. J. Peterson of the Pacific-American Steamship Association addressed the young men and their guests.

● Banquet Date Announced.

The big doings are scheduled for December 4, shipmates . . . and it's the Fairmont again for the anuual Christmas Banquet.

● Golf Plans Coming Up!

The fall tournament will be held during October. Time and place and the "dope" on the features under promotion will soon reach you through the mail.

● New Members.

Capt. Jos. Orlando, Standard Oil Co., San Francisco.

Captain Fred Conrad, McCormick S.S. Co., San Francisco.

Captain N. E. Nichols, California Nautical School, Tiburon, Calif.

Mackay Receives Contract

A contract for the installation and operation of radiotelephone service on the transatlantic liners Manhattan and Washington has been placed by the United States Lines with Mackay Radio and Telegraph Company, it was announced recently by A. J. McCarthy, vice-president of the steamship company. The contract, signed by McCarthy and Admiral Luke McNamee, president of Mackay Radio, calls for the most advanced ship to shore telephone installation developed by radio art up to the present time.

"This new addition to the up-to-date facilities offered to travelers by the Manhattan and Washington," McCarthy said, "will make it possible for passengers traveling on the two largest American vessels in transatlantic service to talk by telephone to almost any part of the world when the installations are completed by November 1st."

The ships' units will operate with the powerful radio stations of the American Telephone and Telegraph Company in New Jersey, and with stations of the British Post Office Department in England. This means that telephone users on the ship may be connected with ninety-three per cent of all the telephones in the world, representing some thirty-five million subscribers. The ship to shore service reaches the entire United States, which accounts for approximately nineteen million of the total.

A secrecy device, which makes certain the privacy of conversations,and which is new as applied to ship to shore telephony, will be a feature of the equipment on the Manhattan and Washington. This device, by inverting the frequencies of voice tones, sends out from the transmitters an unintelligible jargon meaningless to any radio receiver but the stations equipped to unscramble the frequencies.

Each vessel will have three receiving installations, one patroling for calls from the United States, one for calls from Europe, and the third alternately supporting the other two so that the ships are in constant contact with both sides of the Atlantic.

Thomas A. Short to Continue Supply Business

Formerly Superintending Engineer of the Alaska Packers Association, in which position he served for the past ten years, Thomas A. Short left that post during August to succeed the late Carleton V. Lane as manufacturers' agent and sales engineer.

Short spent four years as machinist apprentice at the Union Iron Works, then made his first sea voyage on the W. S. Rheem, Standard Oil Company of California tanker, as

Thomas A. Short.

junior engineer. Then he transferred to the Pacific Mail Line, where he secured his first license as third engineer, leaving to go with Williams Dimond Co. as third assistant engineer on the Cansumset, later transferring to Matson as second assistant engineer on the Matsonia. From the Matson Line Short went with the Standard Oil Company of N.Y. as first engineer on the tanker Royal Arrow, from which post he went to the Union Oil Company as chief engineer, then to the Alaska Packers Association as superintending engineer, where he remained until taking over the Lane business.

L. R. Caverly to San Francisco

L. E. Caverly, who has long been identified with marine affairs on the Pacific Coast, has recently established offices in the Merchants' Exchange Building at 465 California Street, San Francisco, as naval architect and engineer and marine surveyor.

Mr. Caverly started his career with the Union Iron Works of San Francisco and remained with the Bethlehem Shipbuilding Corporation for some years after the Union Iron Works became a part of the Bethlehem organization.

After leaving the Bethlehem Shipbuilding Corporation, he was associated for several years with Fred A. Gardner as consulting naval architect and marine surveyor in San Francisco, and in 1917 was one of the group that established the Los Angeles Shipbuilding and Drydock Company at San Pedro, Calif.

Mr. Caverly served as naval architect and chief engineer for the Los Angeles Shipbuilding and Drydock Company for some time, later serving in the capacity of vice-president and general manager of that company.

Since leaving the Los Angeles Shipbuilding and Drydock Company, Mr. Caverly has been engaged in private practice on the Pacific Coast as naval architect and marine surveyor, and now maintains offices both in the Merchants' Exchange Building at 465 California Street in San Francisco, and at 315 Avalon Boulevard in Wilmington, Calif.

Interocean Changes

Owing to the growth of business in the Los Angeles district, Interocean Steamship Corporation recently made two changes in personnel, E. N. Tormey, Los Angeles manager, transferring to the new dock location at Terminal Island, and Walter F. Wilkinson being appointed manager in charge of the Los Angeles district.

American Steel Announces New Vice-President

John May has been elected vice-president in Charge of Sales of the American Steel & Wire Co., subsidiary of the United States Steel Corp., according to an announcement by C. F. Blackmer, president of the company. He succeeds Dennis A. Merriman, who is retiring.

John May.

May's service with the company dates back to February, 1909, when he was employed as a correspondent in the order department at the New York office. In May of the same year he was transferred to Worcester, Mass., as assistant to the educational director of the company and in October returned to the New York office as correspondent in the electrical and wire rope sales.

In May, 1910, he was made a salesman in the latter division, which position he retained until being made Assistant Manager of Sales in the division in January, 1918. He was appointed manager of the division in February, 1922, and in March, 1931, was made Assistant General Manager of Sales of the company. May was appointed to the position of General Manager of Sales in March of this year.

International Surf Boat Race

A crew representing the San Jose, of the United Fruit Company, won the First Annual International Surf Boat Race rowed in standard monomoy United States Coast Guard surf boats, over a two-mile course in New York Harbor, Saturday, September 11.
The Americans rowed the two miles in 22 minutes, 5 seconds. A British crew from the Furness Withy Liner Queen of Bermuda was second, covering the course in 22 minutes, 25 seconds; an American crew from the United States Lines Washington came in third, rowing the course in 22 minutes, 37 seconds. There were four other entries, which finished in the following order:

			Crews From	Time
4th	UNITED STATES	COLOMBIAN STEAMSHIP CO.	COLOMBIA	23:12
5th	UNITED STATES	STANDARD OIL CO. OF N. J.	CHARLES G. BLACK	23:35
6th	GERMANY	NORTH GERMAN LLOYD LINE	EUROPA	24:35
7th	GERMANY	HAMBURG AMERICAN LINE	HAMBURG	25:20

The Honorable Joseph P. Kennedy, Chairman of the U. S. Maritime Commission, presented the Joseph W. Powell Trophy to Herbert Friswold, coxswain of the victorious crew. The trophy must be won three times for permanent possession.
Kneeling, Left to Right: John Melas, Frank Ley, Alonzo Hathaway.
Standing, Left to Right: Otis Marston, George Franks, Arne Johansen, H. Harris Robson, Herbert Friswold, Earl Schneider, Hon. Joseph P. Kennedy, Judge Mathew J. Troy, J. J. Kelleher, Egil Leines.

Shipowners Association Effective

At the annual meeting of the Shipowners' Association of the Pacific Coast, held Friday, September 25, at 214 Front Street, all officers and directors were re-elected. R. W. Myers continues as president, S. D. Freeman and Nat Levin remain vice-president and secretary-treasurer respectively.

The directors and companies they represent are:

S. D. Freeman—S. S. Freeman and Co.

J. A. Lunny—McCormick Steamship Co.

R. C. Robinson—Hammond Shipping Co., Ltd.

L. C. Stewart—Sudden & Christenson.

O. R. Johnson—National Steamship Co.

W. R. Chamberlin—W. R. Chamberlin & Co.

H. F. Vincent—E. K. Wood Lumber Co.

J. L. Reed—J. R. Hanify Co.

E. Whitney Olson—Oliver J. Olson & Co.

G. F. Grant—Coos Bay Lumber Co.

A. J. Nolan—P. L. Transportation Co.

Legion "Salt Water" Post

With Patriotic Hall decorated with 25 house flags representing some of the U. S. steamship lines calling at Pacific Coast ports, and a brief talk on their origin and significance, Merchant Marine Post No. 420 and the other "Salt Water" Posts of the American Legion located in downtown Los Angeles fittingly celebrated Constitution Day. The principal speaker was Louis J. Euler, Past Exalted Ruler of the Los Angeles Lodge of Elks.

The "Salt Water" Posts of the Legion in the Los Angeles district include Merchant Marine, Yeomanette, Fleet, Naval Reserve, Navy and Submarine Posts.

Pledged to the cause of a new and adequate American Merchant Marine and to restore it to its rightful place in world commerce, Merchant Marine Post of Los Angeles is one of the most active units in the American Legion. Sharply restricted in membership to World War veterans in the steamship and allied business, the members "know their merchant marine," and much constructive work is being done by the Speakers' Bureau of the Post. Numerous talks on the need for an adequate merchant marine have been made before service clubs and other organizations, and an average of one speech a day is scheduled for October.

Merchant Marine Post is the first post in the Legion restricted entirely to marine men. The movement is spreading to other coast cities.

The most potent bulwark ever raised against scale and corrosion in the battle for efficient and economical marine boiler operation—

The HALL MARK signals victory for shipowners thus protected!

Today 224 vessels have eliminated mechanical boiler cleaning expense because their owners realize the value of the HALL SYSTEM OF BOILER WATER CONDITIONING.

The Hall Laboratories has earned the confidence and respect of every shipowner it is serving.

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Hall Laboratories, Inc.
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Phone GArfield 2047
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Hagan Corporation
Bowman Building
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RUGGED! SENSITIVE! THOROUGHLY RELIABLE!

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Fire Alarm Systems

The Cory Fire Alarm System, Type CA 2045 is approved by the U. S. Bureau of Marine Inspection and Navigation. The system consists of a series of mercurial thermostats located at various points and connected electrically to an automatically supervised fire alarm circuit panel.

Simple means are provided on the panel for fire and trouble tests. Partial or total grounds or power failure are immediately indicated on the panel. In case of power failure, the reserve battery is automatically switched on.

The complete system is rugged, positive and fool-proof.

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BENDIX MARINE PRODUCTS COMPANY, INC.
(Subsidiary of Bendix Aviation Corporation)
754 LEXINGTON AVENUE BROOKLYN, NEW YORK

Names and News

LUCKENBACH CAPTAINCY CHANGES

Changes in Luckenbach captains recently announced were:

Captain Ralph Mackinnon, from the William Luckenbach to the Susan V. Luckenbach, in order to bring the latter ship out to the Pacific Coast;

Captain F. W. Heck took over command of the William Luckenbach;

Captain C. A. Bergman took command of the Susan V. Luckenbach upon arrival of the ship at San Francisco.

Captain Mackinnon has now been assigned to shore duty for the company as pilot.

C. F. AHRENKIEL

C. J. Beck, managing director of the freight department of the Hamburg-American Line-North German Lloyd, has announced the appointment of C. F. Ahrenkiel as assistant managing director in New York, to be in charge of freight and terminal operations of the companies.

Ahrenkiel has spent many years in the shipping industry, and takes with him the experience and knowledge that this important post demands.

J. KUROKAWA

After serving as Los Angeles representative for the Osaka Shosen Kaisha Line since 1932, J. Kurokawa has received word from the Osaka office of the company of his promotion to assistant general manager of the New York office, United States headquarters for the line. S. Kigoshi will succeed him.

GEORGE C. DEW

Replacing John G. McNab, deceased, George C. Dew has been appointed foreign freight agent for the Canadian Pacific. He was formerly associated with the company up to the time of the War.

NAVY DAY CELEBRATION

Plans have been set in motion for a city-wide demonstration and celebration on Navy Day, October 27.

Meeting in the Supervisors' chambers at the City Hall, a Citizens' Committee, appointed by the mayor, elected Supervisor John M. Ratto as general chairman, and outlined preliminary ideas for Navy Day, which is held annually and fixed to coincide with the birthday of Theodore Roosevelt.

Walter Walsh, president of the Western division of the Navy League of the United States, was named executive chairman, and Miss Lotus Coombs, secretary.

Rear Admiral A. St. Clair Smith, commandant of the Twelfth Naval District, sent word that the Navy would cooperate in every way in make the celebration a success and that several warships would be assigned to San Francisco to participate in the Navy Day program.

FIREMAN'S FUND PROMOTIONS

As a result of action taken by the directors of Fireman's Fund Insurance Company at a meeting held in San Francisco recently, and the anticipated concurrence of the directors of the affiliated companies, the following promotions are announced:

Edward T. Cairns became first vice president of all the companies of the group, and will hereafter devote more of his time to administrative duties in addition to supervision over underwriting.

Charles C. Hannah became second vice president of the fire companies and retains the management of the Eastern Department, with headquarters in Boston.

George E. Townsend is advanced to vice president of the fire companies in charge of fire underwriting throughout the Pacific Coast territory.

Bert G. Wills, already a vice president of the indemnity companies, is made a vice president of the fire companies and will remain in charge of automobile underwriting for the Pacific Coast.

Leland S. Gregory and Raymond L. Ellis are advanced to assistant vice presidents of the fire companies, and will assist Townsend in the conduct of fire underwriting in the head office field.

D. C. BROOKS

Announcement was recently made that D. C. Brooks has been appointed sales promotion manager of the Westinghouse Electric International Company. He was educated in England, and in 1928 entered the Merchandising Division of Westinghouse in this country. He was later connected with the London office, where in addition to his activities in England, his work took him to France, Algeria, Morocco and Tunisia.

Brooks will be head of the sales promotion division, which will carry on the sales promotion and advertising activities of the company. He will make his headquarters at 150 Broadway, New York.

SANTA PAULA PERSONNEL

When the Santa Paula arrived at San Francisco on September 28 Captain John L. Beebe was in command, relieving Captain Alf Adler, who is on vacation. The former was chief officer before that voyage. William C. Twigg came in as chief officer, with Roy P. Finnegan as acting chief engineer. William A. McLean was back at his post of purser, after being off for two round trips, and John Robey was chief of the ship's freight department.

CAPTAIN A. F. PILLSBURY

After a six weeks' visit in the East, Captain A. F. Pillsbury, member of the firm of Pillsbury & Curtis, has returned to San Francisco. He is a veteran shipping man at this port, and is very popular among the older generation, to which he belongs, as well as among the present one. He visited his old home in Rockland, Maine, and took in New York and other Atlantic Coast ports.

SWAYNE & HOYT CHANGES

From Los Angeles comes word that, owing to increased business, Swayne & Hoyt, Ltd., has made two changes in personnel in that office. W. E. Dillon, former traffic representative, has been given the post of district freight agent. He has been with several intercoastal steamship companies for a number of years. H. G. Seibert, traffic representative, has been given exclusive charge of Eastbound Gulf solicitation.

A young native painting pottery in San Pedro Tlaquepaque, near Guadalajara, Mexico

Lake Atitlan near Guatemala City, 6000 feet above sea level

Special Tools for Ship Equipment

(Continued from Page 43)

securing the two halves together. The other part is seen in Fig. 4 under the American 5-foot radial drill where the holes already drilled are being spot faced on their bosses under the casting flange by means of a back facing operation. This is performed by a cutter slipped over the lower end of the tool bar after the bar has been run down through the drilled hole. The convenience of the radial drill is obvious when one considers how readily the spindle and drill are shifted from one hole center to another without the necessity of shifting the heavy casting from start to finish of the drilling and spot facing job.

● Other Machine Operations.

Among other recently installed tools in this shop, one, a Monarch 26 inch lathe, is illustrated in Fig. 5. The job in the four-jaw chuck is a casting which is being turned ready for cutting off into piston rings. The casting is, of course, faced, bored and turned to size while held in this manner, and then the rings are cut off one by one to required length while the end of the cylindrical job is retained in the grip of the chuck.

● The Contour Sawing Machine.

The big Doall contour machine shown in Figure 6 is used for a variety of purposes in different shops according to class and type of work handled. This machine has been fully described in these columns in its various applications to tool room work and to general shop undertakings. In the installation at United the machine is quite generally employed for such work as the sawing out of heavy shims and the like where the metal may run to ¼ to 3/8 inch thick or more.

The view in the photograph shows the machine sawing rings, a most convenient method of doing this class of work. The general principle of the contour saw is such that very thick and heavy parts may be cut accurately to shape and size and much time saving effected in the process. Aside from the work specially referred to here, a few typical jobs may be mentioned as characteristic of economical performance in the shaping of odd shaped pieces such as die openings and punches; components for jigs and fixtures which are afterwards welded into an assembled unit; cams of all shapes and proportions which are especially difficult to work out to exact dimensions by conventional processes; and many other classes of parts commonly required to be made in the general shop and tool room.

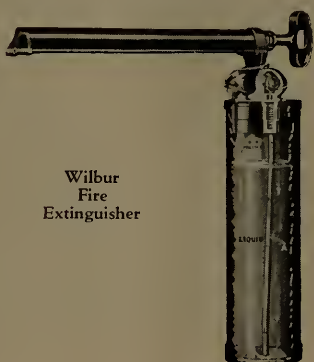
Provision is made on the machine for the cutting out of circular work of large as well as small diameters, and with marked faithfulness of contour, and inside cuts are possible as well as outside work by threading the saw through an opening drilled in the blank stock and welding the saw ends together in an operation requiring two or three minutes only.

H. P. Gray, president, and Robert Christy, manager and secretary-treasurer of United Engineering, have just announced that they are now sole owners of the T. J. Moynihan plant and property located at the southwest corner of Folsom and Fremont Streets, the additional plant to be tooled up for ship hull repair work.

Wilbur Fire Extinguishers

The Hercules Equipment and Rubber Company of San Francisco has recently been appointed California distributor for Wilbur Fire Extinguishers. In accepting the appointment, Hercules pointed out that the growing popularity of this extinguisher is due to its unique construction, which assures greater reliability, easier handling, and more economical maintenance.

Its design is entirely different from that of other hand-pump type extinguishers. In this extinguisher the operating mechanism never comes in contact with the liquid. This eliminates the possibility of corrosion or gumming of the pump-action, which, it is said, occurs when the pumping mechanism is immersed in the liquid. The Wilbur operates by pumping air pressure into the container, thus forcing the fluid out in a steady, powerful stream.



Wilbur
Fire
Extinguisher

When in use the pump is in the position illustrated. This places the weight of the container close to the body and makes the extinguisher very easy to handle. When not in use the pump folds against the container. This folding action closes both air and liquid valves, giving positive protection against evaporation or leakage.

Carbon tetrachloride fluid is used. This is generally accepted as one of the most efficient and economical extinguishing agents.

This extinguisher may be had in either one-quart or two-quart size. It is manufactured by the Wil-X-Mfg. Corp., a division of the Mergenthaler Linotype Company, Brooklyn, N.Y., internationally famed for their precision manufacturing standards. Wilbur extinguishers and liquid comply with the standards of the U.S. Bureau of Navigation and Steamboat Inspection, Underwriters' and Factory Mutual Laboratories.

Fortune at Sea

(Continued from Page 31)

world charter rates were climbing at a dizzy rate, and regular ships of foreign registry left American trades for more lucrative tramp business.

The Fortune speaks of horrible and apparently perpetual loss in American shipping. At the same time they speak of "Gift Horse Profit" and "lush nap of subsidy income." But they do point out that American shipping has a much wider angle than the profit motive, and that is to shuttle back and forth over the same route, "win, draw, or lose." And that is precisely what the mail contracts and now the subsidies were and are for—to guarantee a dependable service at all times.

Says Mr. James D. Mooney:

"American shipping men have had a seedy time of it during the past fifteen years, and are definitely due for a well-deserved break."

War-built tramps, uncertainty of Government policy, the world depression, drop in volume and low rates, and labor trouble made terrific inroads upon earnings. But the American shipowner is still at the wheel, and he has "penetrated nearly every major trade route, has intricate working organizations, and a million other things that make up technical dexterity."

But to follow through we must answer the "unanswerable contention that other nations, by subsidizing their own fleets, force the United States to follow suit or else retire from the game."

American writers must distinguish between "Bribe system" and "Competitive Equality." They must help to dramatize the natural wealth of ship lore as concerns American ships; encourage shippers to ship and travelers to travel American; publicize the demand of the American public for service and discipline aboard ships; demand of the Government that American ships receive parity in all respects with foreign ships serving American shores, then they can forget about investments and profits. These will come.

Says Mr. James Edmund Duffy, our noted news columnist:

"Should an aroused American public suddenly become ship-minded and make possible the expansion of our merchant marine by patronizing American vessels, it would be the end of the celebrated and much talked of alien sea queens. . . . These mighty liners would lie idle and rusting in their home ports."

The American national program, however, is not and cannot be to usurp all American trade. But in self-defense, for peaceful purpose, and for safety sake, our own merchant marine should be able to lift one-half at least of our own overseas commerce. The cost to do this will be repaid a hundredfold from whatever angle one views it. We are a world power; economically, commercially, politically, and our natural geographical position makes of us a maritime power.

Fortune has started the parade. Let others follow suit.

There is a little rhyme which seems apropos here. It comes, we think, from the pen of George Hedley. We quote from memory:

"What bring you, sailor, home from the sea?
Treasures of gold and ivory?"
"When I went to sea as a little lad,
An old jack knife was all I had.
I've been where the gold lies thick to see,
And sailed to the coasts of ivory;
But now at the end of a busy life,
Well—I've still got my old jack knife."

Universal Application of The Manual Cutting Torch

Whether the welding process involves the electric arc, the gas welding torch or any one of numerous automatic welding processes, the cutting torch remains the universally required tool. If one were to consider the perpetuation of modern construction, maintenance procedure, dismantling operations or design simplicities without the availability of a suitable cutting torch, one would have to recognize that industry would be obliged to give up virtually all of the advantages gained during the past quarter century.

Illustrated in the two accompanying pictures is the scrapping of a 60-foot long, 21-inch diameter shaft which was taken out of the old ship Contra Costa. The dismantling and scrapping operations were conducted by J. F. Petersen of Antioch, California, and a straight head Victor Model No. 430 cutting torch made this a relatively simple operation. Note the engraving which illustrates how smoothly the cutting torch produces a straight cut through the center of this 21-inch diameter shaft.

Barriers To Industrial Waste, a new edition of the 68-page insulation booklet, published by Johns-Manville.

This booklet contains a complete and improved table of recommendations to serve as a guide to the proper selection of J-M Insulations for a wide variety of uses in practically all industries.

Added features of this new edition are: A section dealing with JM-20 Brick, a new type of 2000 degree F. insulating brick; a page describing Stonefelt, a new insulation composed of mineral fibres.

Some Questions Answered

(Continued from Page 25)

even established foreign lines to join American lines to petition the American Government to take action under authority inherent in the Merchant Marine Acts of 1916, 1920, 1928.

Thus, even with the mail contract payments, it is really remarkable that the established American ship lines were able to withstand the economic storm.

With the return of better volume in cargo movement, higher rates, and travel, American labor troubles set in.

On the Pacific Coast foreign lines largely escaped these months of tie-up and the hundreds of job actions after the men returned to work. The foreign ships were able to discharge and load full or nearly full cargoes in Vancouver, B. C., and kept right to schedule. Thus, up to the present writing, the American ship lines have not had the opportunity for earnings that normal times will afford.

Thus, earning record and financial reserves of American ship lines of today are misleading terms and will create an impression that may do extraordinary harm to American national shipping.

3. Is shipping sufficiently stable and profitable to attract large-scale private investment? If not, can it be made so?

American investors bought shares in established foreign lines after the World War to the tune of at least one hundred and thirty-one million dollars. American capital owns more ships and tonnage under foreign flags than the total American merchant tonnage serving overseas routes. Why? Because the initial cost of the ships is less, the cost of operation is less, and there is less government in foreign shipping.

Americans are no whit less patriotic than other nationals.

They would prefer the American flag to a foreign flag above the stern of their ships. The 1936 Merchant Marine Act says that American ships are to be had and operated on parity with like foreign ships in direct competition. That is all the American owner wants—no more, no less. Whether we have an American merchant marine under private ownership or under Government ownership makes no particular difference as far as parity is concerned. The only difference is that under Government ownership that parity may and undoubtedly will cost the American public more.

With a twenty-year surety of parity, an immediate initial cost parity and a continuous life parity in the operation of each ship, the American owner believes that all the necessary money for the building up of an adequate fleet will be available.

4. How important is shipping as a customer of other industries, both in building and in operation? (Ship lines in foreign trade disburse about $200,000,000 a year. Who gets this money?) What areas are benefited by prosperous maritime commerce?

Every state in the United States has a vital interest in American shipping. Every state furnishes some material to shipyards in the building of ships. Every state ships products overseas. The former United States Shipping Board and the Shipbuilders Council have elaborate statistics on this subject. Another survey should be followed by proper dissemination of this information to granges, clubs, and associations of the entire nation. Newspapers and national magazines must cooperate. Faultfinding and sensational write-ups giving false impressions of America's merchant marine have been the bane of American shipping.

This must be corrected if we want to succeed afloat.

Germany made the whole nation ship-conscious by propaganda, regattas, prizes, excursions, lectures, etc.

Even today England carries on her propaganda. Schools have special ships assigned and pupils correspond with officers and crew, and upon return to England the master or one of the officers reports in person or in writing to the sponsoring school. What do we do? We often even refuse school children permission to inspect the ships while in port.

● Policy of the United States

1. Shall we build in private yards, in Government yards, or in both?

American merchant ships should be built, repaired and renewed in private American shipyards. If Government yards are permitted to bid on the building of merchant ships they should be equipped with cost accountancy based upon the best American manufacturing practices and be limited to working conditions demanded of private shipyards.

Further, Naval authorities should always remember that these merchant marine ships are built primarily for commercial purposes and must compete with foreign ships in the same trade. They must be suited for quick conversion to national use, but avoidable gadgets should be eliminated as far as possible.

2. Can the ship operators raise the necessary down payments for private building? If they do, are they likely to default?

This question is moot at this time. Most owners have gone through eight years of famine and troubles.

As yet they do not know the real purpose of the United States Maritime Commission. Thirty-three and one-third per cent allowance in initial cost of the ships probably will not furnish parity. Will the balance be considered as interest, depreciation and insurance charges? Will the Maritime Commission provide parity in foreign ship construction bounties, subsidies, low interest loans, full differentials in wages and manning scales, food allowance, repair bills, supply prices, and staff costs? Will the Postmaster General favor American ships with mail at American or international postal rates?

And will Congress note and try to correct preferential trade practices hurtful to American ships? Also, what about labor troubles; will they be solved soon?

These are some of the questions that the owner must face when trying for additional finances. With equal or competitive opportunity the American investor will invest in American ships. The proof is in the fact that he has invested hundreds of millions so far in both American and foreign shipping.

(Page 68, please)

Enjoy Hawaii's year-round spring . . . her lulling surf . . . the gaiety of her hospitable people. Sailings every few days.

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HERCULITE
Tempered Plate Glass

Building in American Yards

(Continued from Page 47)

ping Company; 600 gross tons.

Hulls Nos. 1427-1428, inclusive; two welded steel covered lighters 110' x 33' x 9' 6"; for Reading Co., Philadelphia, Pa.; 1120 gross tons.

Hull No. 1429; one steel ferry flat 64' x 14' x 3'; for Marchand Ferry Company; 21 gross tons.

Hull No. 1430; one welded steel barge 255' x 40' x 14'; for Kieckhefer Container Corp; 1600 gross tons.

Hulls Nos. 1431-1434; four welded oil barges 195' x 35' x 9' 6"; for stock; 1956 gross tons.

This makes a total of 14 hulls with a total gross tonnage of 5947 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937; delivery date, January, 1938.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936 launched August 25, 1937; delivery date, March, 1938.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October 22, 1937; delivery date May, 1938.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937.

Hull No. 30, Saury (SS189); keel laid June 28, 1937.

Hull No. 31, Spearfish (SS190); keel laying date September 9, 1937.

Hull No. 33, Seadragon)SS194); 1450 tons.

Hull No. 34, Sealion (SS195); 1450 tons.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; keels laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, **DD397 Benham, DD398 Ellet and DD399 Lang,** estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; Isherwood Arcform design of hull form and longitudinal hull framing. Hull 143, Esso Bayonne, keel laid December 16, 1936; launched July 24, 1937. Hull 144, keel laid February 8, 1937. Hull 145, keel laid June 7, 1937.

Two destroyers, DD411 and DD412.

Two 12,900 ton tankers for Pan American Petroleum & Transport Co.

Hulls Nos. 149-150, two 12,900 ton tankers for Pan American Petroleum & Transport Co.; Isherwood Arcform design of hull form and longitudinal hull framing. Estimated completion date October, 1938.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110 x 52 x 8'. **Launching date September 21; delivery date, approximately October 15.**

JAKOBSON & PETERSON, INC.
Brooklyn, N.Y.

NEW CONSTRUCTION:

One all welded steel diesel bulk oil delivery launch for Socony-Vacuum Oil Co.; 55' x 13' 6" x 7' deep; 60 HP Model 36A Fairbanks-Morse engine, 3:1 reduction gear.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

One all welded towboat for Pan-American Petroleum and Transport Co., Texas City, Texas; 64' 11", beam molded 18', depth molded 7' 6", equipped with 380 H.P. Atlas Imperial diesel. Delivery date December 1, 1937.

Four all welded oil barges; 173' x 39' x 8' 6", for Pan-American Petroleum & Transport Co., Texas City, Texas. **Delivery dates October** to December 1, 1937.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank steamer,** 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,-700,000 gallons of oil. Estimated **launching date, September, 1937; delivery date, October, 1937.**

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **One double ended steel diesel ferry boat,** 208' x 62' x 9', for the Claiborne-Annapolis Ferry Company; keel laid September 15, 1937; delivery date May, 1938.

DRYDOCK AND ROUTINE REPAIRS: **Converting William A. McKenney from a general cargo vessel to a self-trimming collier; completion date October 1, 1937.**

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935. No. 412, launched May 8, 1937.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359** air craft carrier **CV5, Yorktown,** for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, **Mustin,** and **414 Russell;** estimated keel laying, August, 1927.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6". Keels laid May 24, 1937.

PHILADELPHIA NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600, beam 61' 9¾", depth molded at side to main deck amidships 42'0 3/8", draft corresponding to normal displacement 21'10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404,** 1500 ton destroyer; no dates set.

PORTSMOUTH, N. H., NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15' 7"; launched August 24, 1927; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16' 8"; keel laid September 17, 1937; completion date June 1, 1939.

SS192, Squalus, submarine; contract period started December 1, 1936; L.B P. 302'6", beam 26'10", loaded draft 16' 8"; completion date August 1, 1939.

SS196, Searaven, submarine; completion date February 1, 1940.

SS197, Seawolf, submarine; completion date April 1, 1940.

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin

(Page 70, please)

Building in American Yards

(Continued from Page 47)

screw diesel electric drive mine planter for submarine and cable service; L. O. A. 184', L.B.P. 163', beam molded 35', depth molded amidships at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launched June 22, 1937; delivery date, October, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively. Keel laid for first ship May 20, 1937.

SUN SHIPBUILDING AND DRY DOCK COMPANY

Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; launching date, January, 1938; delivery date, February, 1938.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launching date, October 2, 1937; delivery date October 16, 1937. No. 162, launching date October 30, 1937; delivery date November 13, 1937.

Hulls Nos. 164 and 165, two diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 164, keel laid December 15, 1936; launched September 26, 1937; delivery date October 16, 1937. No. 165, launching date October 16, 1937; delivery date November 20, 1937.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. Delivery date, January, 1938, and February, 1938, respectively.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T. Keel laid September 1, 1937.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; keel laying date October 11, 1937; delivery date, September, 1938.

Hull No. 170, one single screw steam tanker for Bernuth, Lembcke Co., Inc., New York; length 462'4"; beam molded 65' 0"; depth molded 35' 0", DWT approximately 12,900 tons. Keel laid September 20, 1937; delivery date June, 1938.

Hull No. 171, one single screw steam tanker for Tide Water Associated Oil Co.; 462' 4" x 65' x 35'; 12,900 dwt.; delivery date July 6, 1938.

UNITED SHIPYARDS, Inc.

Staten Island, N.Y.

NEW CONSTRUCTION:

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; estimated delivery, October 15, 1937.

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively. 840 and 841 launched May 7 and June 3, 1937; 842 launching date November 15, 1937; delivery dates December 8, 1937; January 5, 1938, and February 2, 1938, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 14, May 24, and July 22, 1937, respectively; launching dates November 5, 1937, December 6, 1937, and January 6, 1938, respectively; delivery dates, December 15, 1937, January 12, 1938, and February 9, 1938, respectively.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6". Keels laid June 8 and July 22, 1937; estimated launching dates October 5 and October 19, 1937; estimated delivery dates October 9 and October 23, 1937.

Some Questions Answered

(Continued from Page 64)

3. If the Government builds vessels for charter, in what way can the public interest be safeguarded?

Presently a great many of the ships required, particularly until experience furnishes the answer to the above questions, must undoubtedly be built and chartered under Title VII of the 1936 Merchant Marine Act. The public is safeguarded; first, in that it will receive the service necessary to protect the trade in which the ships are engaged; second, in the availability of these ships as naval auxiliaries; third, by the rigid requirements of the 1936 Merchant Marine Act; fourth, by the title to the ships remaining in the name of the Government; and fifth, by the desire of the charterers to make good and purchase the ships at the end of five years.

● The Cost

What will be the cost?

The determination of the total cost of construction and operating subsidy differential must be based upon a national survey and the extent to which regular services are to be maintained, size, type, speed, number of ships, and the frequency of service.

In his report to the United States Shipping Board, H. N. Lawrie, eminent economist, states:

"The expense of developing a strong American merchant marine, however great, would be returned directly many times to the people of this country in lower freight rates."

Names and News

E. F. L. STURDEE

Recently appointed assistant passenger traffic manager for Eastern lines, E. F. L. Sturdee, general passenger agent at Vancouver for Canadian Pacific Railway Company, has left to assume his new duties at headquarters in Montreal. He is succeeded at Vancouver by G. Bruce Burpee, formerly assistant general passenger agent at Montreal.

C. E. HOLLAND

Announcement has been made of the appointment of Captain C. E. Holland as Pacific Coast marine superintendent for Furness (Pacific), Ltd. He was formerly master of the Pacific Exporter, and succeeds Captain J. H. Goodwin, deceased, in his new post. Headquarters are located in San Francisco.

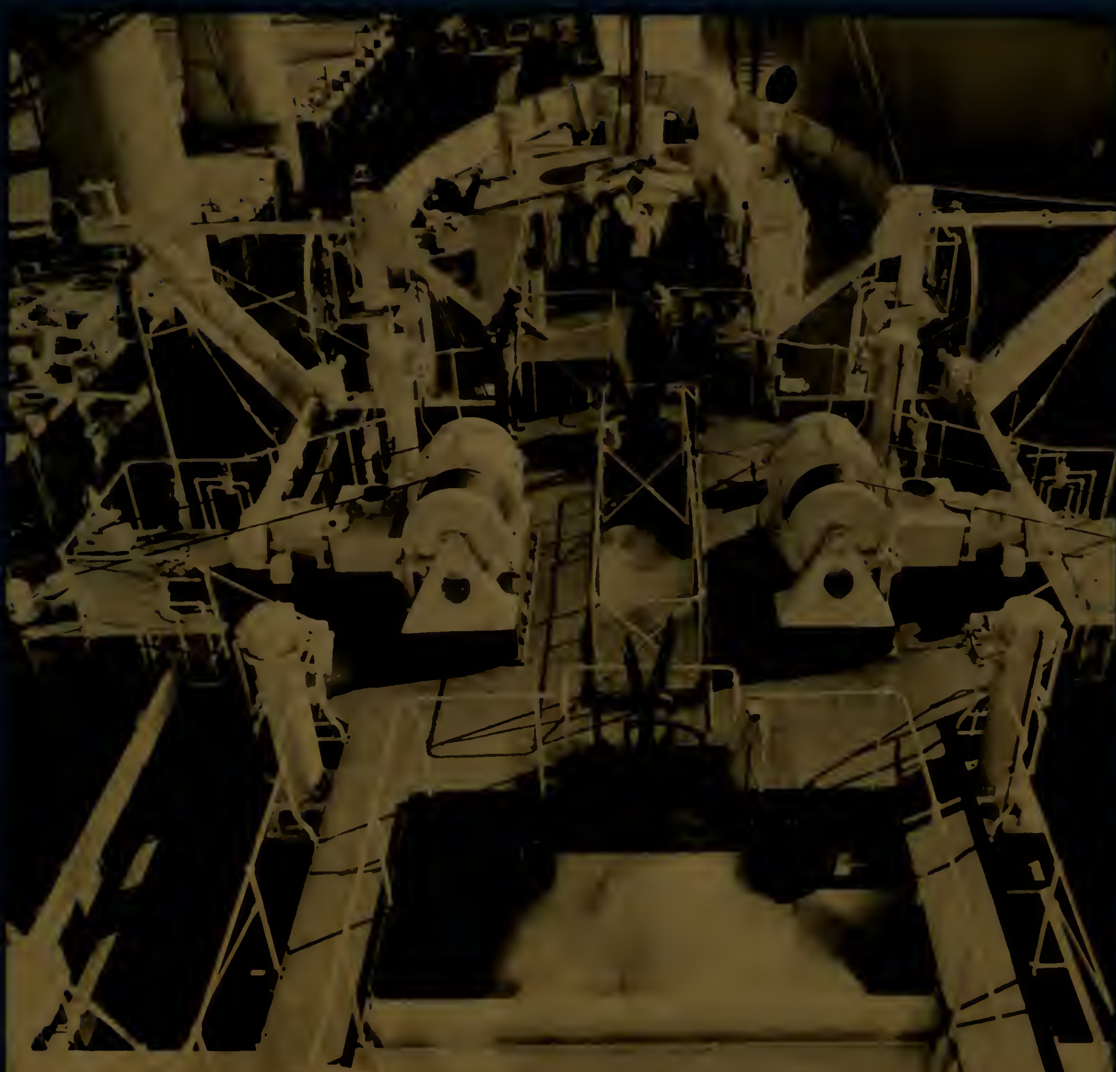
HARRY GRAHAM DONALD

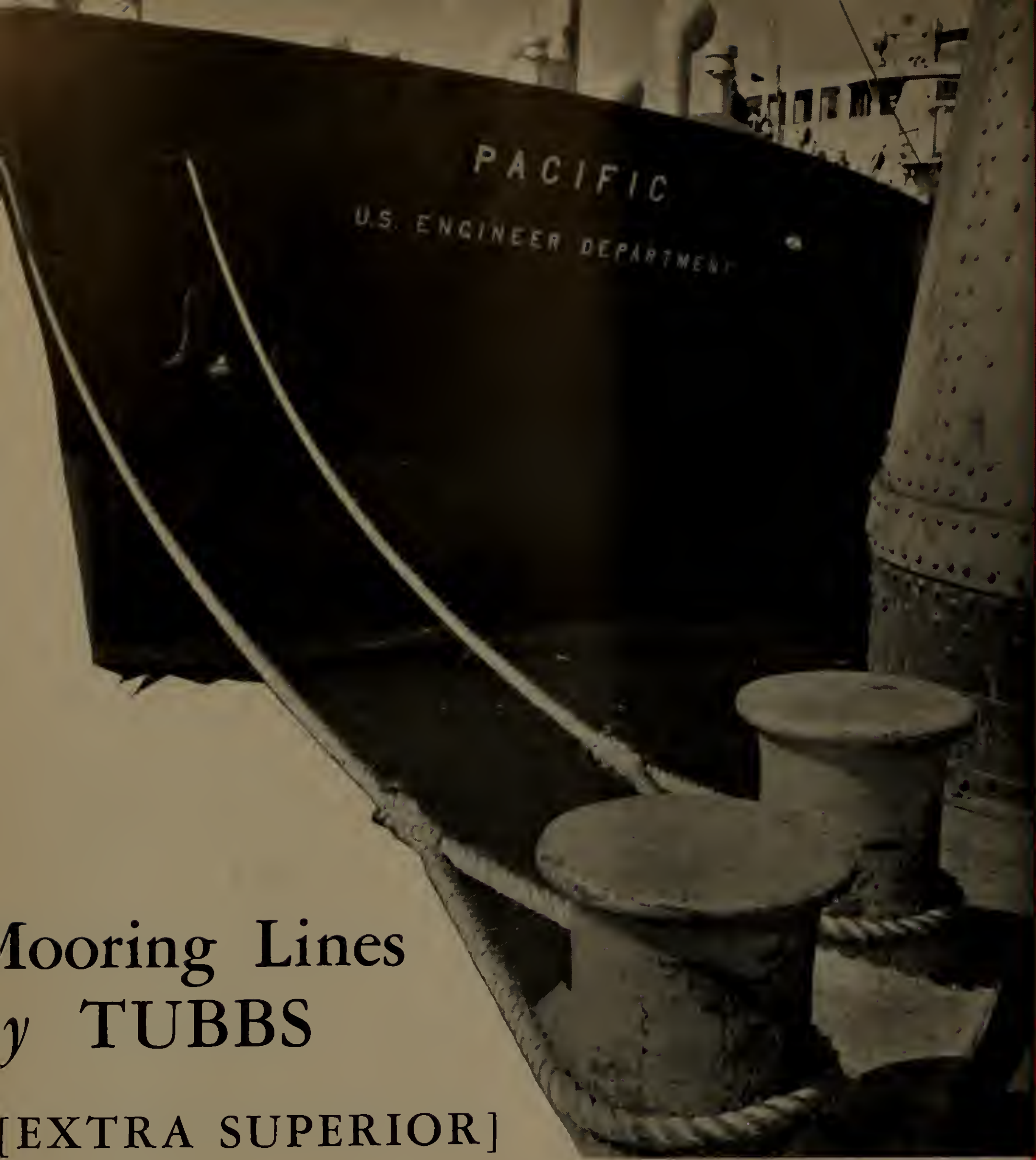
Retiring from his post as chief engineer of the Empress of Britain, Harry Graham Donald has become superintending engineer for the Canadian Pacific at Vancouver after 34 years at sea. His successor on the Empress of Britain is Edward Redmond, formerly of the Duchess of York.

BENJAMIN J. GUERRA

The appointment of Benjamin J. Guerra as special representative of the "K" Line, with headquarters in San Francisco, has been announced by Erik Krag, vice-president and general manager of the Interocean Steamship Corporation, agent for the line. His appointment was effected in connection with the Mexico, Central, and South American service, inaugurated early last year. Guerra will also act as special traveling representative, visiting the agencies along the route of the South American service as far as Valparaiso. He was formerly assistant general manager of the Mexican Mail Steamship Company in San Francisco, and is very familiar with the trade of the countries included by the special service.

PACIFIC MARINE REVIEW





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CONTENTS

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PACIFIC MARINE REVIEW

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Maritime Commission Needs
A Pacific Coast Representative

The Pacific westward outlet is the natural outlet for the surplus products of the United States. The greatest potentialities in future foreign trade face America from across the Pacific Ocean. For this reason the responsible commission which is directing the future policies of the American merchant marine in foreign trade should include in its membership representatives of the Pacific Coast.

As it is presently organized, the U. S. Maritime Commission represents the following groups: American business efficiency experts, American naval officers, American politicians, and American attorneys. Geographically the Commission represents that portion of the United States lying north and east of Washington, D.C. Politically the Commission of five members is restricted to "not more than 3 from any one political party."

There is very persistent rumor amounting to practically certainty that the very efficient chairman, Mr. Joseph P. Kennedy, will very shortly resign. He took the position under protest and with the understanding that he would resign before his term expired. Mr. Kennedy undoubtedly is one of the keenest practical business efficiency experts in the United States. Certainly he has been and is the spark plug of Commission activity. When he leaves the Commission it will have no practical businessman left in its body and no member who has had commercial shipbuilding or shipping experience. Its members are all good men in their respective lines, but these lines are not shipping lines.

All this being so we would respectfully suggest that the President, if and when the resignation of Mr. Kennedy or any other commissioner is in his hands, appoint a man who has had considerable commercial experience in shipping and who represents the Pacific Coast-Oriental viewpoint in that experience.

The Pacific Coast citizen most prominently mentioned at the time of the final appointments early this year was E. E. Johnson. He is still available.

Mr. Johnson is eminently fitted to serve on the Maritime Commission. His long experience as a commercial ship operator, both on the Pacific Coast and in Oriental ports, would be invaluable to the Federal Government, both in the design and building of new ships and in the control and regulation of the shipping business. This experience covers the important ports of Japan and China in the Orient and the principal ports of all three Pacific Coast states. Along with this stored-up experience, Mr. Johnson possesses a rare ability to clothe the ideas emanating therefrom in forcible, clear, emphatic English prose in both oral and written form.

We of the Pacific Coast desire and need representation on the United States Maritime Commission. Here is a man who is a "natural" for such representation. Let us all get busy and "boost" E. E. Johnson for this appointment.

The Maritime Commission needs representation from the Pacific Coast in order to get the whole picture of the necessity for and the needs of a great American flag merchant marine in the international trade routes of the world. Here is a representative of the Pacific Coast who is a recognized practical shipping expert and is not tied financially to any shipping operator. Let us accept him and use his experience for the benefit of the American merchant fleet.

Comment

More Analysis of the Law Under which the American Merchant Marine Now Operates, and Some Suggestions for Modification and for More Practical Application of its Most Important Provisions

By E. E. Johnson

The 1916 Shipping Act stated that we were to have an American merchant marine "to meet the requirements of the commerce of the United States . . . . with foreign countries."

The 1920 Act averred that the United States was to have "vessels sufficient to carry the greater portion of its commerce."

The 1928 Act confirmed the aspirations of the 1920 Act.

The 1936 Act changes the words "greater portion" to "substantial portion."

This change of front, historic with us, undoubtedly prompted the British to state:

"Our companies have long found it possible to do with the American merchant marine what the Admiralty are urged to do with the American navy—dismiss it from their calculation."

Section 201 b, 1936 Act, prohibits the utilization of any experienced shipping man in the affairs most concerning their life work, by the three year clause. It is an aspersion on the integrity of all steamship men. The British have a successful mercantile marine. Their views are:

"It should be clearly understood that the Government were not going to undertake the running or the ownership of the mercantile marine. None but conceited fools would think of doing anything of the kind.

"We have no intention of interfering with the way in which the industry is manipulated. Freight markets are not understood by politicians, and if they are invaded by amateurs they would be fertile ground for failure."

These are the statements of Mr. Walter Runciman, chairman of the British Board of Trade.

Section 204 b permits the transfer to the Interstate Commerce Commission of the regulatory powers over the nation's steamship business. So far as the overseas shipping services are concerned, the transfer may prove to be a very expensive and dangerous step. We are not overly exercised about any neutrality of the I. S. S., though its main functions are and must be railroad control. But the inherent delays as to complaints, hearings and findings may prove to be too comprehensive and cumbersome to effect urgent relief. Foreign competitive entanglements may not be properly digested, understood, and met. Rules and regulations undoubtedly will be too fixed and inelastic to permit immediate control over foreign competitive practices. And foreign shipping cannot be effectively controlled without serious encroachment upon State and Commerce Department functions.

Regulatory functions should remain with the Commission and a liaison arranged with the I. S. S. to coordinate the functions of these two branches of the Government where they meet. The law is specific on through rate preference on inland imports and exports. It is not effective. American railroads have agreements and preference routings with foreign lines. That needs cooperation. Inland American goods receive preferential tariff duties if shipped via Canadian railroads overland and by British ships. America permits imports via British ships and Canadian overland rail haul. Here both American railroads and ships take

on the Nineteen Thirty-Six

Merchant Marine Act

the loss. This is subject to cooperative function.

Section 205 is designed to force direct ship services to small and often interior ports. Ocean shipping is presently cursed with shifting to too many ports and piers. This serves to increase costs very materially and tends to further casualization of longshoremen.

Large and specialized ocean freight and passenger liners, running on permanent routes and tight schedules, cannot shift as readily as can the cheaply operated foreign cargo liners. The result is costly absorption of transshipment costs, extra handling and proportionate damages. It would undoubtedly be better for the goods, the merchant, and the ships if the first medium of transportation, railroads, trucks, or barges brought the goods direct to a permanent pier operated by the overseas steamship company, so that shifting could be avoided, the longshore labor be greatly decasualized, the ship's crew have more time at home with their families, and repairs and loading be done without excessive overtime and shipshod speed. This is a fertile field for study and promulgation of rules and regulations devised to reduce American transportation costs.

Section 301 sets up provisions for minimum manning and wage scales and working conditions on subsidized ships. Shipowners generally are in harmony with this effort, but suggest careful analysis of effect upon the much greater unsubsidized tonnage. Consideration must be given to the general seafaring practices of the other maritime nations consistent with safety factors in force everywhere.

Section 301 b 1 covers complaints. Efforts must be made to eliminate frivolous and maliciously trumped-up charges that only serve personal grudges, cause costly and exasperating delays, and are used to discredit the American merchant marine.

Section 301 b 3, 4, 5, and other naval reserve provisions should be enlarged to include seamen of all ranks.

Section 301 b 6 makes it mandatory upon all officers to have their meals served in the main dining saloon. This is on a par with demands that the junior officers and crew be permitted to mingle freely with the passengers and have the free run of passenger quarters. Our experience is that officers below the rank of chief deck officer and chief engineer, particularly dining relief period, 4 to 8 watch, do not want to be forced to change into dress uniform and to take the necessary time for formal dinners; nor do they wish to break up the informal club like atmosphere of the officers' mess.

Section 302 b, c, d, e, f, prohibits the use of more than ten per cent of aliens after 1939, and those must be eligible to naturalization. There is harmony with this proviso, particularly for cargo carriers and deck and engine room crews on passenger ships. They should be 100 per cent Americans throughout. Unfortunately, experience in the transpacific service catering departments speaks with irresistible force for modification of present conditions. Either personal service must improve or the American and other passengers will travel on Japanese, British, or other nationality ships. Both British and Japanese use Oriental help in the steward's department, and both furnish excellent service in contrast to the "take it or leave it" attitude of much of the personal service set up on American ships. This attitude is not yet general, but the leaven works throughout.

Presently the American steamship companies are laboring under impossible conditions to render service such as is demanded by a discerning traveling public. This class of grudge service is neither to the good of labor, the nation at large, or the American merchant marine.

Section 401 c, limits contract suits to January 1, 1938. With six months temporary contracts running to December 31, 1937, permanent contracts delayed, and time necessary for trial, discovery for errors, and the necessary corrections, it would seem that the time limit is too short for fair play.

Section 405 a mandates that American mails shall be carried "insofar as practicable" on American ships. The foreign tendency is to hold mails for national vessels. The American tendency has been to forward mail on the first vessel, whether foreign or American. This needs practical application.

Section 502 b provides for a construction—differential subsidy with three limitations:

(1) Principal foreign shipyard center costs instead of the actual foreign costs of a like ship is the yardstick by which the parity to the American owner is measured.

(2) Construction — differential subsidy may not exceed one-third of American costs—unless

(3) Conclusive proof is presented to the satisfaction of four out of five commissioners that the difference is greater, when up to fifty per cent may be agreed to.

The aim of the 1936 Merchant Marine Act is to afford the American owner "competitive equality" with direct foreign competition in the same trade.

There are numerous shipyards in Great Britain and particularly in Scandinavia and on the Continent that specialize in almost standardized ships. Their costs are far below that of other large shipyards where all types, particularly high class passenger ships that do not readily lend themselves to standardization, are built. The application of parity should, therefore, be based upon the type of ship and its actual cost and not upon any particular shipyard, its size, or upon any shipyard center. For instance: A reliable Danish shipyard bid $1,465,000 on a particular ship. A very large German shipyard in Hamburg and Kiel bid $1,664,000 on the same ship. Another very big and well known German shipyard bid $1,950,000; while a leading Dutch firm bid $1,660,000. One of the biggest, most responsible, and best known British shipyards bid $2,449,440, offered a very high loan at low interest, and asked for permission to rebid if the business became firm, when they would bid based upon Continental material and prices. An American bid for the same ship was $4,500,000.

Here the one-third construction-differential subsidy would not come even near parity to the highest bid made by the British yard, and fifty per cent would not meet the highest bid by the most modern equipped and best known German shipyard, while the American shipowner tackling the particular trade considered would have to meet the competition of the ships actually built in the lower price bracket shipyards. The ship in mind was to be a very high type of combination freight and passenger ship, 12,000 tons deadweight, 100 first class passengers, 200,000 cubic feet refrigeration space, speed 18 knots. On 10,000 ton d.w., 15 knot cargo liners the proportional difference was even greater.

The transpacific situation is more highly complicated. The Japanese national program, with construction bounty up to yen 220.00 per gross ton, bolstered with low cost but efficient labor, and enhanced by a favorable and very low exchange, presents a competitive feature of first magnitude.

The one-third construction-differential subsidy may and probably will not furnish first cost parity. The four out of five affirmative vote requirement tends to freeze the one-third limitation, and no provision is made to meet foreign construction subsidies.

If the Government builds, owns, and possibly operates the ships, the parity feature becomes an automatic measure. The competitive feature of both initial and operating costs will have to be met out of direct earnings and tax appropriations. Thus we may as well meet the issue squarely under private operation, which, if efficient, should cost less than under Government operation. But, whatever is done, to be effective and permanent the American national shipping program must cover a long range and be stabilized.

Section 502 c provides for construction loans up to 75 per cent at 3½ per cent. This also is designed to afford parity with foreign shipowners. Does it? The Fairplay, September 27, 1934, states in relation to the British Scrap and Build program that the British Government advance 75 per cent construction loan at not to exceed three per cent. And again: January 18, 1935, in relation to the Silver Line, "The Government lent, in which the Commission shall find the American operator to be at a substantial disadvantage. The word "maintenance" requires clarification. Possibly the word "supplies" would be more applicable, because repairs are also considered as maintenance.

The words "and any other items

Section 509 permits 75 per cent construction loan to coastwise operators. Inasmuch as our valuable coastwise fleet also needs modernization, this is a wise proviso. Here the coastwise owner, protected by the Coastwise Act of 1817, and not limited to specific route service, gets the full benefit of the three-quarter loan on the actual cost to him, in marked contrast to the overseas service owner, who must pledge a specific and fixed service, win, draw, or lose.

Section 601 provides for an operating-differential subsidy "to place the proposed operations of the vessel or vessels on a parity with those of foreign competitors."

Section 603 b enumerates that the subsidy shall be applied to insurance, maintenance, repairs, wages, subsistence, and any other items of expense under the Trade Facilities Act, about 100 per cent on the fleet." The American shipowner must pay 25 per cent of the actual cost to the Maritime Commission. Thus the loan on the parity cost to the American owner is 62.5 per cent on the one-third construction-differential subsidy basis, or a 50 per cent loan on a fifty per cent subsidy basis.

Section 505 a, b, provides for: competitive bids by shipbuilding yards; that profits over ten per cent will revert to the Government; and that salaries are limited to $25,000 annually. The Government does not guarantee the ten per cent profit, but any loss may be deducted from any profit earned during the following year—if there is any. The danger herein is that shipyards, particularly on account of the labor situation, may and probably will provide for emergencies to such an extent that their bids will be thrown out, Navy yards may be overcrowded, and the investing public, when new yards are needed or established yards need modernization, may look askance at this investment. Other manufacturing establishments are not so limited as to profits and salaries, and the vital industry of shipbuilding may suffer.

of expense" undoubtedly are used to cover such items as additional depreciation and interest charges by reason of higher initial costs, even with construction - differential subsidy, due to lower labor costs, several kinds of foreign construction bounties, and low interest on very favorable construction loans.

This clause is fixed and mandatory as to parity. It states that the calculations on the above items shall be as "if such vessel or vessels were operated under the registry of a foreign country whose vessels are substantial competitors of the vessel or vessels covered by the contract."

This, therefore, contemplates actual operating parity with direct foreign competition. It does not set up a weighted average of all nations. This is important, because certain trade routes have certain advantages or disadvantages that do not apply in other trade routes.

Section 604 should be liberalized to the extent of recognizing definitely the actual subsidy paid by foreign governments to their respective national lines which are in direct competition with specific American ships in American world trade routes.

The clause is too inelastic in that one commissioner can block the application of a definitely known and proved disadvantageous factor, be that construction bounty, mail contract, outright subsidy, or trade and tariff preference.

Section 606-5 provides for the recapture of one-half of the net profit after five per cent capital reserve, ten per cent profit, and five per cent special reserve as calculated at the end of five years.

The Commission requires a definite and fixed schedule of service with specific types of ships for the life of those ships. The ships must shuttle back and forth regularly regardless of cargo and passenger commitments. To be sure, Clause 4 of Section 606 provides for modification of the contract under the Commission's determination, but the fact remains that the obligation to perform the stipulated service is inherent in the contract and can be enforced. The Commission must under the law provide competitive parity, certainly no more. The law stipulates that a profit of ten per cent on the capital necessarily invested may be paid out of yearly profits. It does not guarantee a ten per cent profit, but the operator must furnish a suitable bond to perform the contract.

The foreign shipowner may keep all the profits, if any, and do with these profits as he pleases. The American shipowner, if placed on parity, no more, must split fifty-fifty with the Government over any five year period. To that extent the American shipowner will be at a further disadvantage with the foreign shipowner, which may have a tendency to frustrate the intent of having the American public invest in American bottoms.

The whole of Section 607 needs clarification as to the application of capital reserve fund, special reserve fund, net earnings, capital necessarily employed, investment, withdrawals, distributions and the restrictions thereto.

Section 804, denying any contractor the right to represent any foreign ship service except by the specific approval of four out of five commissioners, may be too severe. The law states definitely that American ships shall be provided to carry a "substantial portion" of its overseas foreign trade. Is thirty per cent a "substantial portion"? Today an average of seventy per cent of America's foreign trade is shipped overseas in ships of foreign registry. If the greater portion of this overseas business was handled by American ships there would and should be force to this clause. As it actually is, the clause is now of doubtful value.

Section 805 a is too restrictive: Foreign lines operating in the Pacific Coast-Europe trades carry passengers from Los Angeles and San Francisco to Vancouver, B.C., and return via Puget Sound and Columbia River, in which they do a land-office business. This clause may restrict a possible American line in this trade from doing likewise.

A first class experienced operator may find it very advantageous to operate a parallel coastwise service or possibly a feeder service in conjunction with his offshore service. This clause, except strict prohibition to divert moneys from the subsidized offshore service to the coastwise use, should be abrogated.

The Section 805 b limitations as to number of and compensation to officers and employees when the contractor is in default cannot and should not be opposed. But so long as the operator fulfills his obligation the limitations should be lifted, including the $25,000 salary limitation. The American shipowner competes with the keenest brains in the world, men trained in world transportation, with generations of shipping tradition behind them. These foreign shipping men have no such limitations as this. It may serve to stultify the shipping industry in the United States by forcing keen-minded men into other American industries where these limitations and restrictions do not apply. Why halter an industry requiring international skill in the most competitive field extant?

There could be no objection to **Section 807** if all industries and associations of whatever nature were under the same restrictions as to lobbying. But to single out an industry as complicated as the overseas shipping, where a lack of understanding of its intricate problems may cause very difficult situations, may be likened to putting emery instead of lubrication into the wheels of progress, or throwing tacks in the path of speeding automobiles.

There are other features of the 1936 Merchant Marine Act that may and probably will need changing for smooth operation. These should be weeded out by the age old process of trial, discovery of errors, and the application of corrective measures.

U.S. Engineers' Shallow Draft Hopper

Union Plant, Bethlehem Shipbuilding Functioning Sand Sucker of Very Bar

By F. C. Scheffauer

Principal Engineer, U. S. Engineers Office, South Pacific Division, San Francisco, Calif.

The work of the U. S. Engineer Department in providing and maintaining adequate waterways for Pacific Coast ports with shallow bar entrances, has been handicapped considerably by the lack of a suitable dredge for the purpose. In order to supply this need there has been built, and will shortly be placed in service, the shallow draft seagoing hopper dredge Pacific. This vessel, constructed at the Union Plant of the Bethlehem Shipbuilding Corporation at San Francisco, California, is of the small tanker type with the material hoppers and all dredging equipment located forward of the navigating bridge. This arrangement permits the bridge officer to have at all times full view and control both of the navigation of the dredge and its dredging operations. Much special hull and machinery planning was required, due to the shallow loaded draft requirement for a satisfactary dredge, and there have been embodied in the vessel many original features of dredging equipment, specially designed for efficient work under the exacting and hazardous dredging conditions encountered in the bar channels of the smaller North Pacific Coast harbors.

The Pacific is a twin screw, twin rudder, two side pipe, all steel vessel of the following general characteristics:

Length overall	180 ft. 3 ins.
Length B. P.	168 ft. 0 ins.
Beam	38 ft. 0 ins.
Depth	14 ft. 0 ins.
Draft light (Forward)	5 ft. 0 ins.
Draft light (Aft)	7 ft. 7 ins.
Draft mean (loaded with 300 cu. yds. sand)	8 ft. 11 ins.
Draft mean (loaded with 500 cu. yds. sand)	10 ft. 10 ins.
Displacement light	865 tons
Displacement loaded	1600 tons
Propulsion power	800 B.H.P.
Propellers — Two bronze 4 bladed, 7 feet 6 inches diameter, 9 feet 6 inches pitch, of towboat type	
Speed light	11.5 miles per hour
Speed loaded (500 cu. yards. sand)	9.8 miles per hour
Maximum depth of dredging	45 ft.
Dredging pump—18 in. dia. driven by a 340 to 425 h.p. motor	
Fuel tank cap.	41 tons (325 bbls.)
Cruising radius	2200 nautical miles
Complement:	11 officers and 27 men

The Pacific was built to conform to the American Bureau of Shipping Rules for Class A-1 in this type of seagoing construction, and its equipment for safe navigating and working conditions will exceed the requirements of the U. S. Bureau of Marine Inspection and Navigation. Much special strength and corrosion resisting steel from U. S. Steel Co., also abrasion resisting steel manufactured by the Carnegie Steel Company has been used in the construction of the vessel to reduce weight and wear. Byers Co. genuine wrought iron piping has been used for all practicable purposes. Wood work has been limited to door and window trim and furniture.

Crew Accommodations

The comfort of the crew has been given much consideration by providing large rooms, comfortable berths and spring mattresses, both ordinary and good clothes lockers, recreation spaces, and first class modern lavatories. Heat for the quarters is furnished by an American Radiator Co. hot water system using Thrush circulating pumps. All plumbing fixtures and a pressure fresh water system were supplied by the Crane Co.

The galley is exceptionally well arranged, with generous use of stainless steel for the equipment and range inclosure. In lieu of the usual steel deck, concrete and tile construction for galley and lavatory

Seagoing

Dredge Pacific

Corporation Ltd. Delivers Smoothly Special Design for Pacific Coast Work

floors, there has been used on the Pacific with excellent results single stainless steel checker plate manufactured by the Alan Wood Co. of Conshohocken, N.J. A material saving in weight was effected thereby. The dredge is equipped with Federal Telegraph Co. radio transmitting and radio compass equipment, Sperry searchlight, Brown Co. draft gage, Sperry rudder indicator, etc.

● **Machinery Installation**

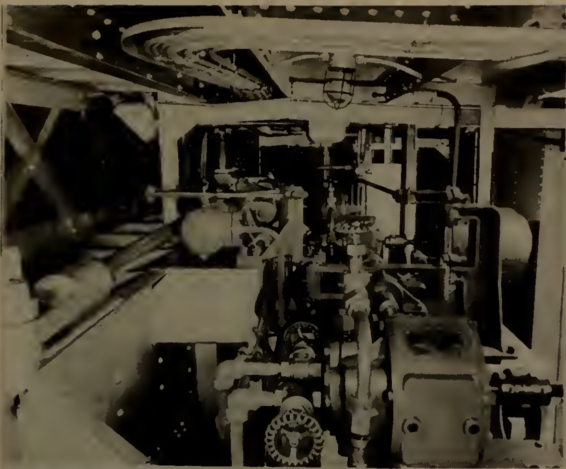
Propulsion power for the dredge is provided by two 400 B.H.P. 8 cylinder Model 8-192-A Winton 450 r.p.m. direct reversible diesel engines, driving the propellers through combined Hydraulic Coupling Corporation Vulcan hydraulic couplings and $3\frac{1}{2}$ to 1 reduction gear units, furnished by Farrel-Birmingham.

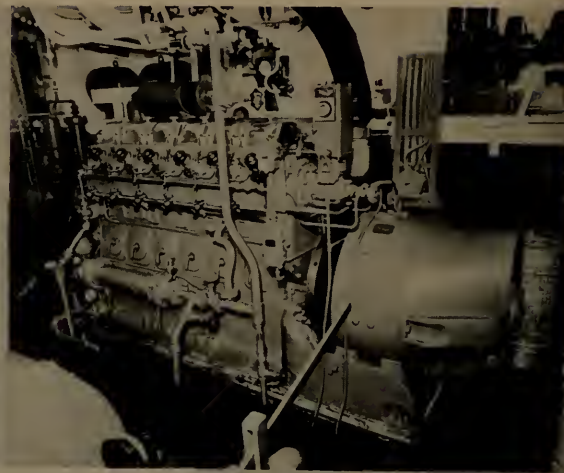
Power for the 340 H.P. dredge pump motor is generated by a 275 K.W. D.C. diesel electric generating set consisting of a 400 B.H.P. 700 r.p.m. 8 cylinder Model 8-213 Winton diesel engine direct connected to a 275 K.W. D.C. 240 volt General Electric Co. generator. All three of these Winton diesels have the welded steel frames fabricated by Lukenweld.

Two 75 K.W. diesel electric generating sets consisting of 112.5 B.H.P. 800 r.p.m. 6 cylinder Model 6-228 Winton diesel engines, direct connected to 75 K.W. D.C. General Electric Co. generators, furnish power for the ship's pumps, steering gear, windlass, hoists, etc., and for the dredging equipment. One 75 K.W. set is reserve. Emergency power is furnished by a 10 K.W. 240/120 volt D.C. Buda diesel electric generating set consisting of a 23 B.H.P. 4 cylinder 1200 r.p.m. Model 4-DG-186 Buda diesel engine direct connected to a

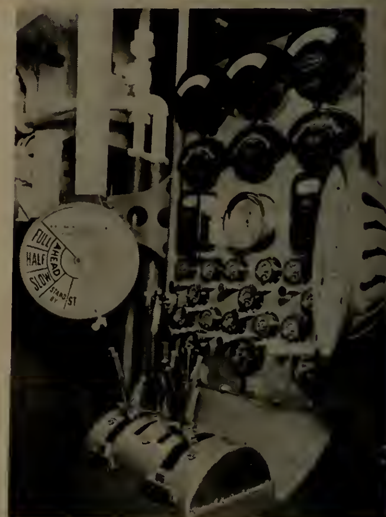
Dredge Pacific on her trial trip, San Francisco Bay.

Below Decks on the Dredge Pacific





Machincry on "Pacific." Upper, left: American Engineering Company hydroelectric steering gear for twin rudders; right: Winton-General Electric diesel generating set. Center, left: Some Lunkenheimer valves; right: The control stand for main engines. Lower, left: The dredge pump and motor; right: The two-pass cooler for diesel engine circulating water system supplied by Condenser Service and Engineering Company.



General Electric Co. generator. This set is fan radiator cooled, has electric battery starter, and is installed at the poop deck level on a Keldur vibration dampening material seating. Lighting current at 120 volts is furnished by a 5 K.W. General Electric Co. balancer set.

All main and auxiliary engines are cooled by a closed fresh water cooling system. This system consists of two 500 gallon tanks, two 15 H.P. Nash Co. 1750 r.p.m. double suction motor driven centrifugal pumps each with a capacity of 550 gallons per minute at 25 lbs. pressure, and a Condenser Service and Engineering Co. two pass cooler with capacity sufficient to cool 550 gallons fresh water per minute from engine jackets at 130 degrees F. to cooler outlet temperature of 114 degrees F. when 500 gallons of 75 degree sea water are circulated through the cooler. One of the pumps is always used for fresh water circulation, the other is ordinarily used for salt circulating water for the cooler, but is arranged to serve as fresh water pump in emergencies, in which case the fire and ballast pump is used as the salt water circulating pump.

This is, perhaps, the first marine installation on the Pacific Coast where fresh water is used in the jackets, and is a step forward. Ordinarily a dredger in stirring up sand, mud, etc. while working, would pass this soiled water through the engine jackets and a considerable quantity of dirt would lodge therein. Also, the use of fresh water eliminates the scaling that would come from using ordinary sea water.

The weight of the cooler is 2000 lbs. approximately; the overall length 8 ft. 3 in.; the overall width 2 ft. 3 in.

Other items of auxiliary machinery and equipment are: Nash Co., 3500 r.p.m. fire and bilge pump, 1750 r.p.m. bilge, sanitary, and Hy Tor priming pumps, all powered with Continental Co. motors; De Laval Unimatic centrifuge; Viking Pump Co. lubricating oil pumps, Northern Pump Co. fuel oil transfer and hydraulic system pumps; Rix Compressed Air Co. main and auxiliary air compressors, all powered with General Electric Co. motors; Kingsbury thrust bearings; Engineering Specialties Co. Vortex spark arrester mufflers; and Goodrich Co. cutless rubber stern tube bearings.

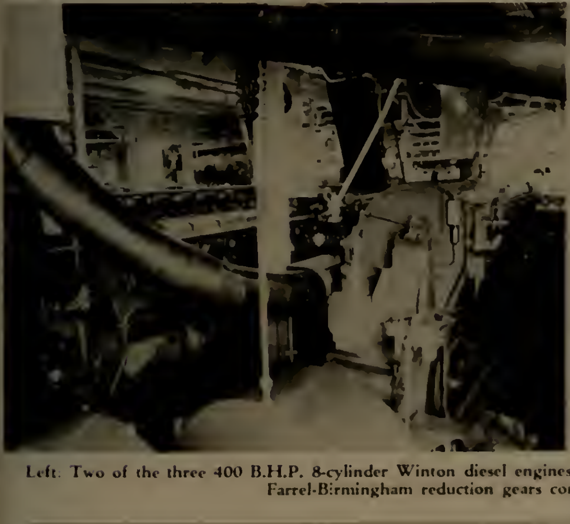
A General Electric Co. (Trumbull Co., San Francisco subsidiary) dead front switchboard and a group control board are located conveniently in the engine room. The group control panel serves all electric equipment except the anchor windlass, capstan and drag pipe hoist motors which have independent controls located close to each.

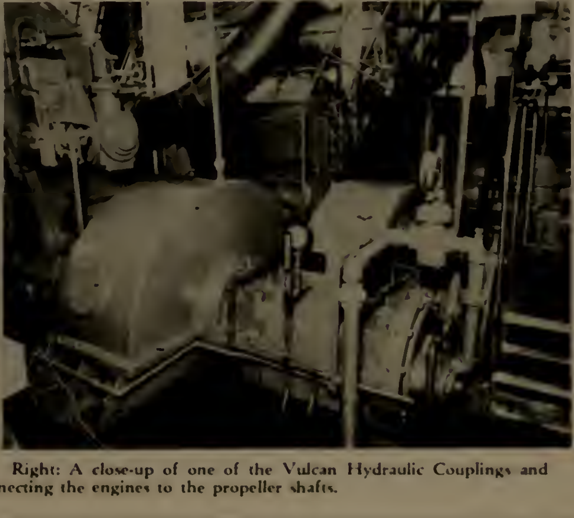
Engine room noises have been effectively dampened by use of Johns-Manville Air Acoustic Sheet material on engine room bulkheads and deck spaces in way of quarters and passageways. A Walter Kidde and Co. Lux C.O.$_2$ fire extinguishing system is provided for the engine room, lamp and paint rooms.

An air cooled refrigeration plant supplied by the Carrier Engineering Co. is installed below and aft of the galley. There has been provided convenient to the engine room a machine shop with lathe, drill press, power hack saw, emery wheel grinder, work bench and storeroom. The main items of deck equipment are: an American Engineering Co. hydraulic twin rudder steering gear, and a capstan, a Hyde Windlass Co. anchor windlass, and a boat hoist, all with General Electric Co. motors; Welin Davit and Boat Corp. lifeboats and davits; and a Kahlenberg whistle.

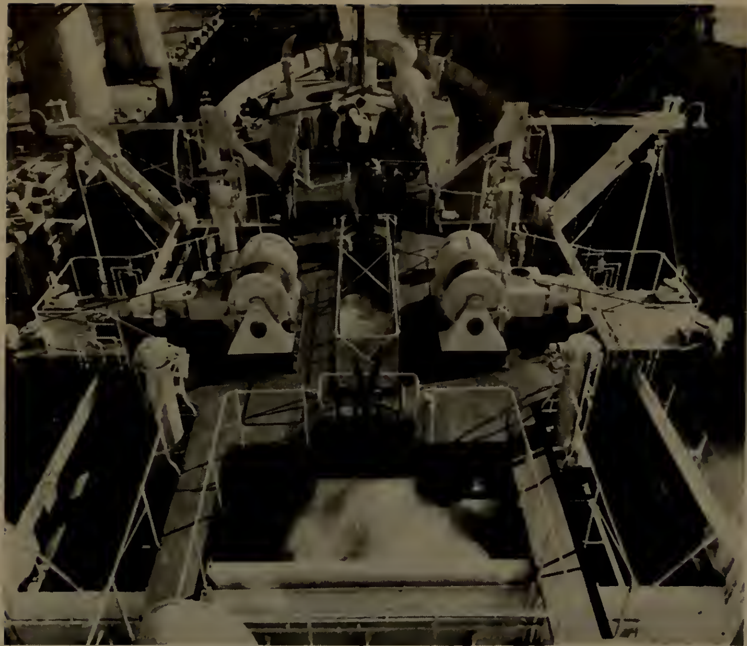
● Dredging Equipment

For those not familiar with the operation of seagoing hopper dredges it is explained that such dredges operate by moving at a ground speed of about 2 to 3 miles per hour along the channel to be dredged with their drag heads at the lower end of the dragpipes dragging on the bottom and the dredging pump running. The dredged material is discharged into the hopper from whence surplus water flows overboard, and when the hoppers are filled with solid material the dragpipes are lifted and the dredge proceeds to the dump ground. When there, the dump gates in the bottom of the hopper compartments are opened and the dredged material drops into the sea. The dredge then





Left: Two of the three 400 B.H.P. 8-cylinder Winton diesel engines. Right: A close-up of one of the Vulcan Hydraulic Couplings and Farrel-Birmingham reduction gears connecting the engines to the propeller shafts.



View of forward deck of Pacific from bridge, featuring discharge of dredge pump into hoppers, and the gear for handling dragpipes.

returns to the dredging ground and proceeds to dredge another load. Seagoing hopper dredges are operated on a 3 shift 24 hour basis similar to other ocean-going craft and remain at sea from Sunday midnight to the following Saturday morning.

The dredging equipment of the Pacific consists of a four compartment hopper, the outboard sides of each compartment being built as movable weir gates which, when lifted for hopper overflow beneath them, provide a hopper capacity of 300 cu. yds. and when lowered for overflow above them increase the hopper capacity to 500 cu. yds. Four feet square hinged hopper doors are fitted in the bottom of each compartment for dumping the hopper load.

For dredging material there is provided an 18 inch centrifugal dredging pump, designed for 210 to 250 r.p.m. and driven by a 340 H.P. General Electric Co. motor. This single pump serves both port and starboard 18 inch dragpipes, which are arranged to be used singly or together, depending on the needs of the particular dredging conditions. The dragpipes are fitted at the lower ends with a special type of self adjusting draghead which makes contact with the channel bottom, and are connected to the pump through ball joints, swivel elbows, hull inlet pieces, and a Y branch with debris manhole at the pump suction side. The ball joints are fitted with a special rubber covering that is vulcanized in place on the ball and forms an effectual seal against loss of suction. This rubber was applied by the Universal Rubber Corporation.

The complete dragpipe units are readily removable for stowage on deck when the dredge is en route between ports or for dredge berthing, by a quick detachable arrangement of the hull inlet connections and the suction elbow stays. Specially designed 18 inch rubber seated suction valves provide safe closure of the hull inlet when the dragpipes are disconnected and the valves are also used for choice or control of single pipe dredging. The dragpipes are raised and lowered by means of double worm differential speed double drum winches located at hopper top level. Two topping davits on each side suspend the dragpipes through spring swivel blocks, and ball bearing sheave tackle. Discharge of material into the hoppers from the pump is by means of a double branch 18 in. discharge pipe fitted with an 18 inch check valve and with control gated nozzles for discharge into each of the four hopper compartments. An overflow trough for carrying off surplus water is fitted on each side of the hopper and two discharge spouts lead overboard therefrom. Hydraulic power at 200 lbs. pressure is used for operation of the weir gates, 18 inch suction valves, hopper dump gate operating gear and for topping in and outboard the dragpipe davits.

● Special Design

On account of the special design and materials required for the dredging equipment, complete detail plans therefor were furnished the contractor by the designing office. In the design of this equipment there was embodied all of the experience gained in many years of dredging Pacific Coast bar and other channels.

The performance of the Pacific during its sea trials on September 3rd and 4th was excellent both as a ship and as a dredge and was the source of much satisfaction to its designers and its builders. It was found that sand dredging with two dragpipes in use on the single dredging pump produced about 17 per cent more material than with one dragpipe, and the test loads dredged clearly demonstrated that the dredge would be a good "digger." Careful tests showed that the Pacific handled particularly well in turning and holding course when running free, and that it maintained excellent steering qualities both when dredging with one pipe and with two pipes.

The practically complete lack of vibration of the dredge both when running free and when dredging was remarked upon freely during the trials and will insure comfortable living conditions for the crew when the dredge is in service.

On the 27th of September dredge Pacific cleared for Portland, Oregon, which will be her home base. On the way up the coast she will be tested out in dredging on several of the bars of the smaller harbors.

C. H. Giroux, head engineer, and H. H. Haas, senior engineer, from the Chief of Engineers office at Washington, D.C., were present for the Pacific trials and aided in making the tests.

Photos by Gabriel Moulin
The galley of dredge Pacific features lavish use of stainless steel, as shown in these illustrations.

The two propeller shafts of the dredge Pacific have a total of six Cutless Bearings; three for each shaft. There is a forward stern tube bearing on each side made for $8\frac{1}{4}$ inch diameter shaft sleeve; an after stern tube bearing for $8\frac{3}{8}$ inch diameter shaft sleeve; and a strut bearing for $8\frac{1}{2}$ inch diameter shaft sleeve. This arrangement, of course, makes it possible to withdraw the shafts aft even without the necessity of removing the bearing from the vessel.

The stern tube bearings are lubricated by means of the usual type of stern tube water circulating system from the inside of the vessel and, of course, the strut bearings simply depend on the natural flow of water through them for lubrication.

Kingsbury thrust bearings on the Army Engineers dredge Pacific are used in connection with the propeller shaft drive. There is one special two-collar Kingsbury thrust bearing between the engine and the driving half of the Vulcan hydraulic coupling. This bearing takes the end thrust generated by the coupling.

The Pacific was built under the direction of Colonel John J. Kingman and Colonel Thomas M. Robins, Division Engineers of the two Pacific Coast division offices of the U. S. Engineer Department. San Francisco District Engineer Lieut. Colonel J. A. Dorst was the contracting officer. The author had charge of the design and construction of the Pacific and was assisted in the work by Senior Engineer H. D. G. Baxter and Associate Naval Architect H. A. Lennon.

PERFORMANCE OF PACIFIC

By F. C. Scheffauer

The Pacific left San Francisco at 4:00 P.M., September 25, 1937, for its future home port, Portland, Oregon, with planned stops at Coos Bay, Umpqua River and Yaquina Bay for test dredging. The author, accompanied by N. C. Bray, Engineer in charge of floating plant of the Portland District, was on board to direct the operations of the dredge.

Pacific, encountering a heavy northwest gale off the southern Oregon coast, had to proceed west to a safe distance offshore, was forced to "heave to" for a time, and was driven back twenty miles. The dredge behaved splendidly during the storm and showed excellent seagoing qualities—no racing of the propellers occurred, no green water at all was taken aboard, and her motion at all times was easy. She arrived, Coos Bay, Tuesday, 3:00 P.M., September 28, one day late.

For this 71 hour run fuel consumption for all purposes totaled 48.3 bbls. of 42 gals. each.

While at Coos Bay, Pacific performed test dredging in two reaches of the bay channel, obtaining 22 and 19.2 cubic yards of sand and shells per pumping minute. Leaving Coos Bay at 6:00 A.M. Wednesday, September 29, a test load was dredged from the entrance bar channel and 26 cubic yards of medium sand per pumping minute were obtained. Pacific next proceeded to the mouth of the Umpqua River, where, under the guidance of local Pilot Joe Butler, the dredge removed two test loads of sand and shells from the shallow entrance bar channel in a confused and rough sea at a rate of 23 and 22.5 cubic yards per pumping minute.

Pacific arrived off Yaquina entrance whistling buoy at 6:30 P.M. the same day, but pilot failed to appear, and storm warnings announced the approach of a strong gale from the south. It was decided to run for the Columbia River without delay. The storm soon caught the Pacific and she rode through the night with a heavy following sea and 60 mile gale. The Columbia River Lightship was sighted soon after daybreak and course set for the entrance channel under heavy rain and extremely poor visibility conditions. The first buoy sighted was found to be black can No. 5 on the northerly edge of the channel. The storm was at its peak at this time and the northerly drift so heavy that it was impossible to pass to windward of the buoy after sighting it. Course was changed to southward and storm oil tank opened, and after a further trying period of anxiously peering for buoys to fix the vessel's progress and position, she at last came safely under the lee of the South Jetty and all hands heaved a sigh of relief.

Pacific arrived at Portland Thursday, September 30, at 10:30 P.M., and remained at her dock Friday, Saturday and Sunday, where she was visited by large numbers. Her appearance, construction, arrangements and performance up the coast evoked much admiration.

The dredge commenced her first regular dredging assignment at St. Helens Channel on Monday, October 4, having dredged while en route to there a test load of sand at Vancouver Channel, Columbia River, at the rate of 30 cubic yards per minute. At St. Helens Channel the Pacific obtained 16.5 cubic yards per pumping minute of very fine sand mixed with sawmill rubbish—a difficult dredging material.

The officers and personnel of the Portland U. S. Engineer Offices have expressed themselves as being greatly pleased with the Pacific in every respect, and judging from the amount of work scheduled for the vessel she will be kept more than busy at all times.

BUILDING

Safety into Merchant Ships

By L. L. Westling*

Assistant to Engineering Manager, Matson Navigation Company

Deeply enshrined in history we find the traditional attitude of the old time sailor, in which the criterion of safety at sea was summed up in the ability of a vessel to remain afloat and stable under extreme conditions of weather and of loading. Topping this was his pride in his profession, his admirable courage, and his confidence in his own ability to meet danger and successfully hurdle the ever present hazards. Such things were accepted as an inseparable and necessary part of the seafaring life.

Hazards as we study them today, such as falling from elevated places, tripping over obstructions, and inadequate illumination were accepted as necessary evils and unavoidable in the construction and operation of vessels. Such hazards did, however, develop a sailor who put real meaning into the phrase "shipshape," for he had a place for everything, kept everything in its place and carefully maintained equipment upon which he might subsequently risk life and limb.

Such an attitude was developed through generations of seafarers and it is not surprising that safety hazards have not been readily apparent to him. But while the passing of the sailing vessel has reduced certain types of hazards, the self propelled vessel has brought in its wake new hazards and a new type of seaman, who, with few exceptions, requires closer supervision than the old time self-reliant sailor.

During the transitional period between sail and steam the dominating minds were also those of the old school, and naturally enough there has been a slowness in the full appreciation of the need of a safety program. But through an awakening of a sense of responsibility, through a humanitarian urge, through his need for protection from financial liability, and certainly through the untiring efforts of the safety engineer, the shipowner has now become one of the most ardent workers for providing safe working conditions. However, being a very practical man, he has insisted that safety work shall not be carried beyond practical bounds.

● The Human Factor

The degree of safety which may be built into a vessel without entering into impractical extremes is indeterminate and the appraisal of this factor will vary with the individual operator. It is, of course, desirable to develop what could be termed a "fool proof" ship, but that is an ideal which cannot be effected by the assembly of structural materials alone. It has been impressed upon us that a vessel equipped with all modern safety features can become the scene of tragedy, and likewise a vessel poorly equipped can be the scene of orderly and heroic procedure in the face of danger. In emergency, there are few who would not prefer the poorly equipped vessel manned with an alert and competent crew, to the ideal vessel in the hands of incompetent and undisciplined men. It is regrettable that at a time when extreme legislative measures have been heaped upon the shipowner, that an equal importance has not been placed upon other phases of the problem which have tremendous bearing upon safety aboard ship.

● In the Drafting Room

Logically enough, the proper place to begin a program to obtain safe working conditions aboard ship is in the drafting room, where the vessel's details are developed. Too often the designers are men who have had little opportunity to observe actual working conditions of vessels in service, and it is at this point that the ship operator should be a constant influence in the development of the seemingly insignificant details that in operation may become safety features or safety hazards.

In the past the operator has not effectively provided this help, he having depended too completely upon the shipyard, whose standards are frequently of long standing and have not been subject to analysis in the light of safe operations. Consequently there has been little improvement in design which makes for greater safety aboard ship.

In recognition of this situation there gathered during 1935 and 1936, under the auspices of the Pacific Coast Marine Associations, a group of men closely associated with ship construction and operations, and who developed a code embracing minimum safety standards in ship construction. This group included those who saw through the eyes of the engineer, the deck officer, the designer and builder, the safety engineer, the admiralty lawyer, and the federal inspector. The procedure was to make a study of details, using as an outline the logical sequence of ship construction, with a view to promoting safety aboard ship.

Their findings were composed in

*Address before the 26th National Safety Congress, Marine Section, Kansas City, Mo., October 13, 1937.

such a style that the wording could be lifted bodily and placed into construction specifications. Such a phraseology permitted the use of the forceful words "will" and "shall" in lieu of the compromising "shoulds," which mere recommendations would have required. The result met with general approval for the practical way in which safety measures may be built into a vessel.

For want of a better formula, such an outline will be followed in this discussion.

● The Modern Vessel

The modern vessel has become a complicated assembly of an endless number of details, most of which have in their development been subject to influences which are primarily economic in nature. Through extensive research we have developed hull forms of high propulsive efficiencies, power plants of high thermal efficiencies, vessels of excellent structural efficiency, and all manner of means have been forthcoming for providing effective service to the passenger. But details which involve safe conditions for the individual passenger, seaman or longshoreman have been somewhat restricted in their development because of the traditional manner in which such things are done by the industry. Forceful attention has been focused upon these details and new life has been put into the program of safety in ship operation. The proposed United States Merchant Marine building program, if it becomes a reality, should be made the safest on the seven seas. And should it be the nation's good fortune that those in authority should invite the help of the practical merchant ship operator in producing this fleet, a safe and practical merchant marine will be assured.

Such a vessel which we hope to see developed will have little difference in appearance to other modern ships, and the arrangement cannot differ greatly. But closer study should show new details which will reduce accident hazards to a minimum. Like all vessels it will be a unit composed of a steel structure enveloping fuel tanks, water tanks, cargo spaces, machinery, and living quarters, each division having its peculiar type of accident hazard.

● Hull Compartments

Tank spaces, for example, generally represent dangers peculiar to repair work, particularly those in which the fuel is bunkered. Inner bottom tanks represent small hazards in falling because of their small vertical dimension. But there are within dangers which can be minimized principally through the precautions of those who work in or near them, but certain facilities can be supplied which will make them safer. Tanks which have contained oil are not easily made gas free, due to the difficulty in adequate cleaning and due to the tendency of the gases to lie in pockets. Access to such spaces is through a manhole, and the location and number of these openings should be the result of some study of interior and exterior arrangements. A manhole should be of ample size to give easy access to a large man; its dimensions should be not less than 14" x 18". There should be a sufficient number and in such locations that ventilation of the complete tank is possible. Where practical, the openings through the interior structure and framing should be so arranged to provide easy access and permit active air movements. Limber holes should be located to provide quick and effective drainage. Where hinged manhole covers are installed they should be so located that they lie horizontally when in the open position, precluding the possibility of their being accidentally closed. Where possible and practical, guards should be provided for temporary erection about an open manhole.

So-called deep tanks are more easily freed of gases, but the falling hazard is greater. Access is generally through manholes located on the tank top, and the location of the ladder underneath should be such that one who enters should not have to hunt for the rungs nor affect any contortions to negotiate his entry or exit. The ladders should be footsure, even when oil coated.

When it becomes necessary to install an access opening in the bulkhead of a tank, its location should be such as to preclude possibility of anyone standing upon makeshift ladders or boxes. Where such heights are necessary, access platforms should be provided of a permanent type.

Fresh water tanks are subject to the same rules, particularly ballast water tanks, where the air may become too foul for safety.

Access openings of any description in decks or tank tops should be carefully located with respect to deck ladders, passageways, and, where possible, with respect to adequate illumination.

Closely associated with the manhole are the expansion and access trunks, which usually terminate in a deck coaming. Trunk coamings should never be less than 36" in height, which will minimize the hazard of one's losing his balance when working in way of such an opening. The cover should be subject to the same rule as the manhole cover to prevent accidental closing. When the covers are too large for ease of handling, stanchions and rigging should be provided for opening and closing with tackle. A trunk meant for access of men should be not less than 24" x 24", unless piping or other obstructions should require larger dimensions, to permit free movement of arms and legs. The ladders in such trunks should be footsure and ample toe space should be provided.

In close relation to the tank in structure we find the anchor chain locker, which is one of the danger spots on many ships. Chain lockers of excessive width, or of inadequate depth, require that the seaman must go below to stow the heavy chain as it is brought in. The tipping of piles of chain, the jumping of the chain over the wildcat, with the resulting sudden out-rushing of the stowed chain, are not uncommon hazards aboard ship. Such a danger can be completely eliminated by the construction of a locker of proper dimensions and capacity. A locker should have not less than 150 per cent capacity for the chain which the vessel is required to carry. Access to such a space should be through a generously sized hinged manhole. The ladder should be of the plate type with half-moon foot openings to prevent damage by the heavy chain. The manhole should be equipped with a protecting rail or guard.

(Page 54, Please)

A Famous *Shipbuilding Yard Builds a Notable*

Moore Dry Dock Co. Installs Half Million Dollar Fabricating Plant

For many years the Moore shipyard on Oakland Estuary has been closely identified with industrial progress on the Pacific Coast. In its issue of August, 1918, Pacific Marine Review commented as follows on the remarkable record of this establishment:

"The development of the Moore Shipbuilding Company properties from the original Moore and Scott plant on Oakland Estuary furnishes a fascinating story of perseverance and accomplishment, for today the Moore Shipbuilding Plant may be compared favorably with any steel fabricating institution in the United States.

"The Moore Shipbuilding Company's property has been metamorphosed from an ordinary construction and repair yard to a really great shipbuilding establishment, and the fact that during this period of change and growth the plant has stood in the very front rank of shipyards distinguished for their output record, speaks volumes for the skill and energy of the management of Oakland's greatest shipbuilding unit."

During the war shipbuilding period this yard finished over 70 vessels. Today we are on the eve of another progressive period in American shipbuilding history—a period that many of us hope will be saner and more truly progressive than that which was just getting into full swing in 1918. Today we bring also another evidence of the progressively wise management of the Moore Dry Dock Company, formerly the Moore Shipbuilding Company.

During the slump in American shipbuilding the Moore Dry Dock Company maintained a leadership in ship reconstruction and repairs, and at the same time became very active in the fabrication of steel for structural members in steel erections. Steel for many of the largest bridges in California was fabricated in these shops, including over 30,000 tons for the San Francisco-Oakland Bay Bridge and the Golden Gate Bridge. The foundation caissons for both of these huge structures were fabricated and partially erected in the Moore plant.

Steel for the Dumbarton bay bridge and for the huge Sunnyvale hangar was fabricated in the Moore Dry

Panoramic view of new steel fabricating shop and yard. (Pacific Marine Review Photo.)

Steel Shop

Dock plate shop. In fact, Moore Dry Dock during the past 15 years has been and is an active and an increasingly able competitor on every large steel fabricating job on the Pacific Coast.

It is interesting in this connection to note that the first notable structural iron and steel fabricating job in San Francisco was the frame for the great skylight over the central court of Ralston's famous original Palace Hotel. This was designed and fabricated in the shops of the old Risdon Iron Works, and Joseph Moore, the father of Jos. A. Moore, president of the Moore Dry Dock Company, was vice president and general manager of the Risdon at the time.

It will be apparent therefore that for steel buildings as well as for steel ships the name Moore holds a notable place in the industrial annals of San Francisco.

As the volume of structural steel work increased it became evident that a modern structural steel shop would justify its cost, and the executives of the firm and of the Structural Steel Department began five years back to plan a shop that would be ideally suited to the future needs of the Moore Dry Dock Company and the demands of the industry on the Pacific Coast.

At left: The templet room of the new structural shop. (Gabriel Moulin Photo.) At right: A welder with equipment at one of the 36 welding outlets. (Pacific Marine Review Photo.)

In many conferences the following objectives were developed for the design, arrangement, and equipment

View of main bay of new structural shop from west end. (Gabriel Moulin Photo)

(Gabriel Moulin Photo.)

A close-up of the Thomas automatic spacing table multiple punch.

of the new shop:

(1) That all divisions of the structural steel department should be assembled under one roof in a segregated unit.

(2) That this unit be so arranged that executives could have visual supervision of all personnel.

(3) That natural and artificial illumination should be of uniform and sufficient intensity in all parts of the shop.

(4) That there should be ample area for receiving, assembling, and shipping yards, and ample trackage and crane services to these yards and to the shop.

(5) That the unit should be adaptable for ship steel fabrication in the event of a shipbuilding revival.

With these objectives always in view, Mr. B. J. Osborne, manager of the Structural Steel Department, was sent East twice to study the great structural steel plants there, and was sent also to principal Pacific Coast industrial centers to inspect the latest fabricating shops of Los Angeles, Seattle and Portland.

The resultant information, adapted to Moore Dry Dock requirements, was incorporated in the detail designs as worked out by the technical staff of the Moore Dry Dock Company and in the equipment, tooling, and lighting of the shop. Five acres in the northeast corner of the Moore Dry Dock Company property was set aside for the structural department. The old blacksmith shop on this area was torn down and work begun on the foundations for the new unit. These called for considerable piling to support concrete flooring in shop, and special grouped piling under concrete slabs supporting heavy machine tools, crane ways, etc.

Under the foundations of the blacksmith shop were found the earlier foundations of the old Pacific Wire and Nail Company's plant. In driving piles near this foundation several piles dropped down easily for 10 or 12 feet and then bounced back. Investigation revealed an old fuel oil tank buried in the ground, and about half full of good fuel oil.

As completed, this new structural shop covers nearly an acre and a half. The main bay is 105 feet wide by 400 feet long, and the lean-to bays on each side are 25 feet by 400.

Over the receiving yard, on elevated tracks supported on steel trestles, runs a Whiting cab-controlled five motor crane with two 5 ton trolleys. The elevated tracks are 85 foot gage with a clear run of 260 feet. Supported in the same manner and with the same gage, the tracks over the shipping yard carry a Whiting cab-controlled four motor crane with a 25 ton trolley fitted with a $7\frac{1}{2}$ ton auxiliary hook.

The assembly yard is fitted with a 25-ton, 85-foot boom, hammer head crane.

Material flows into the shop on five lines of narrow gage track running longitudinally. Twenty-one overhead cranes carried on transverse tracks lift material from the ground tracks to the tools which are arranged in lines between the tracks. These overhead bridges are fitted with Wright 3- or 5-ton electric trolley hoists. The arrangement of bridges makes it easily possible to transfer trolleys from one bridge to another so that lifts up to 40 tons are easily handled. These cranes are all electric and are operated from the floor by pendant control. They were designed and built by the Moore Dry Dock Company in collaboration with the engineers of the General Electric Company. The system is flexible and economical and completely covers the shop area for any weight up to 40 tons. The design, arrangement and control of these cranes have attracted much favorable comment.

The shop structure is entirely of steel, with the exception that the roof is sheathed with 2-inch Oregon pine tongue and groove lumber covered with 6-ply Pabco composition roofing. All the steel work is covered with aluminum paint and the machine tools finished in a green ena-

mel which gives a pleasing contrast and adds greatly to the efficiency of illumination.

Fully one-third of the roof and side wall surfaces of this shop are in glazed sash. The glass was furnished by Fuller and the sash is Fenestra. Electric light installation gives an illumination intensity of $15\frac{1}{2}$ foot candles per square foot of floor area with no shadows.

The machinery is arranged in lines between the lines of narrow gage track. Each machine tool has ample space all around for handling material to or from its working table. These tools include:

Two Thomas multiple beam punches, each with a capacity for punching 28 one-inch holes simultaneously. One of these punches is fitted with a fully automatic spacing table for material 75 feet in length. The other is fitted with a semi-automatic spacing table for 70-foot material.

One Thomas double angle shear capable of shearing angles up to the largest commercially rolled.

One Thomas plate shear capable of shearing plate one inch thick up to 91 inches in width.

One Thomas duplicating plate punch for plates up to 6 feet by 12 feet.

One Thomas super beam type punch for odd holing.

One Thomas mechanical bulldozer.

One Thomas rotary planer.

Two Dreses high speed radial drills of which one is track mounted.

One Southwark punch fitted with a semi-automatic spacing table.

One Southwark punch fitted with a semi-automatic pantograph table for duplicating. The tables on these two Southwark punching machines were designed by the Moore technical staff and built in the shops of the Moore Dry Dock Company.

A hydraulic press of 350 tons capacity.

One Cleveland rotary planer.

One Hilles and Jones edge planer.

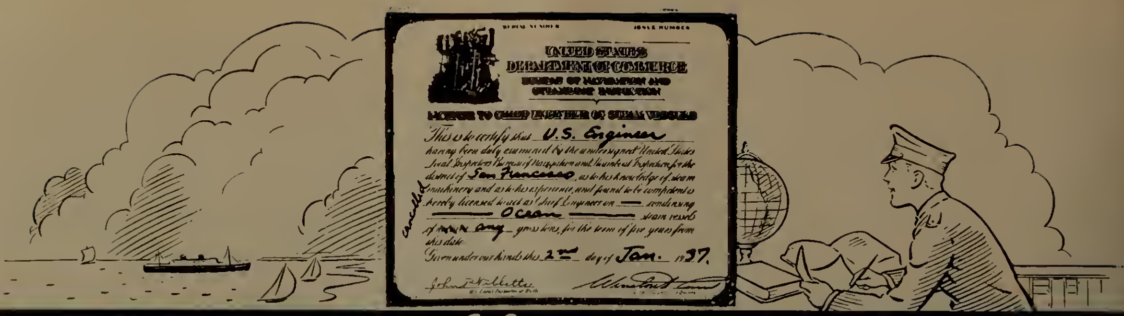
One Hilles and Jones mechanical press.

Numerous other small tools are advantageously located throughout

(Page 68, Please)

(Pacific Marine Review Photos)

Top: Receiving yard and crane. Center: Large high speed radial drill mounted on rails for convenience in spotting work. Bottom: The 25-ton crane over shipping yard.



Your Problems Answered by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

QUESTION

What is dynamic unbalance?

ANSWER

In the previous article we have discussed only static unbalance. This was obtained by having a disk on a shaft with one side of the disk heavier than the other. If we were to have two disks on the same shaft, each with a similar point of unbalance, and that point on one disk at 180 degrees in rotation from the other, and in the same amount, the shaft would be in static balance. This is because, when put on the parallel level balancing rails each point of unbalance would counteract the effect of the other and there would be no turning moment. (1)

If the two disks are separated along the shaft by a distance, say, equal to their diameter, and the shaft is rotated, the centrifugal force of the unbalance points would tend to pull the shaft away from center, and at any particular moment the force from one would be acting in a direction opposite to the other, which would tend to move the shaft to one side at one end and to the other side at the other end. This double opposed force, when rotated, gives the wobble effect.

What boy has not stood his bicycle upside down and turned the cranks rapidly and felt the frame wobble from side to side, due to the dynamic unbalance of the cranks?

Thus, in the dynamic unbalance, we have possibility of a perfect static balance, yet vibration in rotation. This wobble force is called a dynamic couple, because it is present only when rotating.

Another differentiation is that static unbalance comes from the force of gravity on the heavy side while dynamic unbalance comes from the centrifugal force.

If the same two disks, with their equal unbalance weights at 180 degrees from each other, were to be moved very close together the dynamic couple would be reduced, so that when both weights are in the same normal plane (2) the dynamic couple disappears.

Furthermore, the greater the distance between these two disks the greater the dynamic couple.

If the angle between these two points of unbalance is less than 180 degrees we will have static unbalance as well as dynamic. When there is no angle between them we have a maximum static unbalance and zero dynamic couple.

In practice, all rotors are in effect a revolving system with many points of unbalance. For static conditions all points of unbalance may be considered concentrated at one point in the circumference of the rotor and a correcting weight added at 180 degrees from that point. For dynamic unbalance we may consider that the many points of unbalance are concentrated at two points in the rotor. These two points are at an angle to each other of any amount up to 180 degrees and at a distance from each other axially. Thus two corrective weights are necessary. These corrective weights are added at 180 degrees from the respective points of unbalance, but may be at any two points axially, preferably at the two ends, where weights can be conveniently added.

QUESTION

In adding weights what effect has the distance from the center?

ANSWER

In static as in dynamic balancing the distance from the center is very important. With stationary condi-

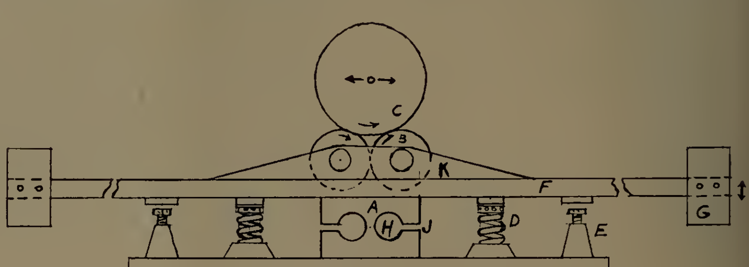


Fig. 1

Fig. 2.

tions the balance weight acts like a scale, the farther out, away from center, the more effective, the effect being directly proportional to the distance from center. With revolving conditions the centrifugal force is proportional to the radius, hence the effect is proportional to the distance from center. Thus the farther from center the smaller the weight for the same effect in either case.

QUESTION

How is dynamic balancing accomplished?

ANSWER

As must be concluded from the foregoing, it is impossible to observe the dynamic couple without actually rotating the system.

The shaft or unit to be balanced is placed in a dynamic balancing machine, a familiar type being known as the Akimoff Dynamic Balancing Machine. It is rotated and allowed sideways oscillation at one end only, the other being held to its true center of rotation. By trial the amount and angular position of a correcting weight is determined. Then the other end is allowed to oscillate sidewise and the first end held to its true center of rotation. The correcting weight and its position is determined for that end. Then by rather complex vector[3] analysis, using the amount, the relative angular position, and axial distance of these two trial weights the amount of final correction is determined for any two or more normal planes and radii.

Rotors are usually provided with means for addition or removal of final balance weights. These new correcting weights are applied, a test run made to check results, and the balance is complete.

QUESTION

What is the general appearance of the Akimoff Dynamic Balancing Machine?

ANSWER

It is essentially a pedestal bearing and support for each end of the rotor. Figure 1 is a sketch of one end looking axially. The shaft C of the rotor is placed with its true journal rolling on the rims of the hardened steel rollers B, which, in turn, are fitted with very fine roller bearings carried on the frame K. This frame assembly carries the beam F and rests on the block A. This is a steel block having the holes H drilled through, and slots J cut, which leaves a relatively thin web of steel to carry the entire weight. This web, between the holes H, is so thin as to allow the sidewise oscillation of the shaft C to take place by acting as a spring web. This motion results in the up and down movement of the tuning weights G and their supporting beam F.

The jacks E are adjusted to limit the oscillation of the beam, but when testing the beam must not quite touch the jacks, nor must there be any other unnecessary friction in the system.

As discussed in a previous article the critical speed of vibration or oscillation is determined by the

(1) Turning moment is a force or torque tending to turn an object about any possible center of rotation.
(2) Normal plane is a term used to indicate a plane which is at right angles to the center line in all directions. Thus the face of a true coupling on a shaft is normal to the center line.
(3) A vector analysis is one using vector quantities, which are values having both numerical and directional significance. That is, the direction or relative angle is just as important as is the value or number.

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Engineers' Licenses

The following list shows the licenses granted during the month of September to engineer officers of the merchant marine at Pacific Coast offices of the Bureau of Marine Inspection and Navigation. For key to abbreviations see footnote.

Name and Grade	Class	Condition
SAN FRANCISCO		
Earl W. Southard, Chief Eng.	OSS, any GT	RG
Frederick W. Schramm, Chief Eng.	OSS, any GT	RG
James O. Reher, Chief Eng.	OSS, any GT	RG
James Blethen, 1st Asst. Eng.	OSS, any GT	RG
David Warwick, 2nd Asst. Eng.	OSS, any GT	O
John W. Leibe, 3d Asst. Eng.	OSS, any GT	O
Clarence E. Clemens, 3d Asst. Eng.	OSS, any GT	O
George H. Betts, 3d Asst. Eng.	OSS, any GT	O
Edward T. Williams, 3d Asst. Eng.	OSS, any GT	O
James A. Lanier, Chief Eng.	OMS, any GT	RG
SEATTLE		
Delmar F. Fletcher, Chief Eng.	OMS, any GT	O
John E. Pershing, Chief Eng.	OMS, any GT	O
James Varney, Chief Eng.	OMS, any GT	O
Chester Sobieski, 2nd Asst. Eng.	OMS, any GT	O
SAN PEDRO		
Conway A. Hall, 1st Asst. Eng.	OSS, any GT	RG
Jack T. Glasscock, 1st Asst. Eng.	OSS, any GT	RG
Hugh B. Hotchkiss, 2nd Asst. Eng.	OSS, any GT	RG

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

For American Deck Officers

Continuing the Historical Background—The Progression from Sail to Steam

Steam vessels made their first appearance about 1800; in most cases they were merely experiments or objects of curiosity, no one except the builders having much faith in them. One of the first was the Charlotte Dumas, built in Scotland in 1802 and used only for towing purposes. Robert Fulton was experimenting in France about this same time, but came to America and built the Clermont in 1807. This was the first steam vessel in the United States, and operated on the Hudson River between Albany and New York, carrying passengers. The demand for passage was so great that by 1809 the Clermont proved altogether too small. In this same year the Phoenix made the trip from Hoboken, New Jersey, to Philadelphia, thereby being the first steam vessel to make an ocean voyage.

By 1820 great strides had been made in the construction and the uses of steam propelled vessels, passengers were being carried from England to Ireland, from England to France, and these ships were being used on most of the important rivers of America. One steam vessel made 2,000 miles up the Missisippi in 21 days, averaging five miles per hour against the descending current.

The English Parliament in 1822 checked the speeds of steam and sailing vessels over similar coasting routes and found that the steam vessels were making the voyages in from one-half to one-sixth the time the sailing vessels were taking, and in some instances were making eight to nine miles per hour.

The Savannah, in 1819, was the first steam vessel to cross the Atlantic. Built in New York as a sailing ship, she was fitted with engines and paddle wheels before launching. This vessel was about 130 feet long, and made the voyage from Savannah to Liverpool in 25 days, being under steam power only part of the time while making this crossing.

The voyage in 1825 of the Enterprise, 70 tons, from London to Calcutta, India, in 103 days was the first long voyage attempted and was an achievement for the steamer and a very noteworthy performance, as this vessel was under steam 64 days during the voyage. By 1838 the Great Western was built for the Atlantic trade. This vessel was 212 feet long and of 1340 gross tons. The forementioned vessels were all propelled by paddle wheels, but during these times experiments had been made with screw propellers, but it was not until 1838 that Captain Robert Stockton, on behalf of the U. S. Navy, ordered two small iron steamers fitted with screw propellers. These vessels were delivered from England and made a success as towboats. The Navy used screw propellers but the merchant vessels stuck to paddle wheels.

The final tests of the screw propeller and the paddle wheel were

Some Old Timers

Center top: Captain L. Meyer; to right and down: Purser Laurie J. Ryan, Chief Officer J. G. Cameron, 2nd D. A. Joyce, 3d Jas. Read, Freight Clerk Walter Ramage, 4th H. Roberts. To left and down: Dr. P. M. Allen, Chief Wm. Allen, 2nd Wm. Brown, 3d Wm. D. Edwards, 5th John Shean, 4th Jas. Malcolm. Approximately 1887.

Change of Masters

Steamer Paul Shoup: L. E. Hawkins; Vice, G. A. Moerman.
Steamer El Segundo: John S. Engs; Vice, A. W. Markley.
Steamer Frank G. Drum: G. A. Moerman; Vice, P. M. Gadeberg.
Steamer Meton: C. H. Winnett; Vice, F. A. Middleton.
Steamer Arizonan: H. W. Dowling; Vice, W. I. Stevens.
Steamer Mapele: K. J. Melanphy; Vice, S. G. King.
Steamer Panaman: J. A. Gaidsick; Vice, John Norborg.
Steamer Lebec: James A. Moore; Vice, A. MacKenzie.
Steamer Hoquiam: Joseph G. Cox; Vice, H. E. Wallanton.
Steamer Tahoe: H. E. Wallanton; Vice, Joseph D. Cox.
Steamer F. H. Hillman: J. S. Christiensen; Vice, S. C. Sullivan.
Steamer Utacarbon: T. R. Fischer; Vice, H. L. Dahlloff.
Steamer R. J. Hanna: S. C. Sullivan; Vice, Dan Thomsen.
Steamer Point Caleta: W. Hansen; Vice, W. E. Warnell.
Steamer Noyo: W. Nielsen; Vice, John Bostrom.
Steamer Carolinian: J. H. A. Gries; Vice, B. W. Hassel.

made in England in 1845 by the Rattler, a propeller driven vessel, and a similar ship, the Alecto, driven by paddle wheels. The sea run made by these two vessels proved that the Rattler, with propellers, had the greater speed, but when the two vessels were tied stern to stern the Rattler towed the Alecto astern at the rate of 2½ miles per hour. After these tests it was only a matter of a few years until the screw propeller had practically replaced the paddle-wheel on all ocean-going vessels.

Engines for the propelling power of steamers were a problem from the beginning, with the single cylinder engine, until 1854, when the compound engine came into being, with its high and low pressure engine and increased boiler pressure (raised to about 42 lbs. to the square inch). When the single cylinder engine was used it ran at slow speeds, and to get the proper propeller speeds, gears were used to increase the speed on the shaft.

The compound engine ran at sufficient speed to properly run a screw propeller without gears. In 1874 the first triple expansion engine was put in the Propontis, but the boilers in this vessel proved a failure. The year 1882 saw the Aberdeen fitted with triple expansion engines and a boiler pressure of 125 lbs. This engine and boilers proved successful.

In about 1840 iron was making its bid to surpass wood as a material for shipbuilding. There were many arguments against iron, but they were soon overcome, and by 1850 it was a foregone conclusion that sooner or later all ocean vessels would be built of this material. 1875 saw the beginning of steel construction, and after a few years of experimenting it was adopted as the best material for ship construction, and to this day is used exclusively for hulls and framing, as well as superstructure and equipment.

Beginning with the Savannah, with her tonnage of 320 gross tons and speed of six knots, the size of steam vessels increased gradually until 1858, when the Great Eastern was built. This vessel was over 300 feet longer than any merchant steamer before her, was constructed of iron, had six masts with yards and sails, paddle wheels and screw propeller. Her gross measurement was over 18,000, and her displacement about 32,000 tons, which is more than some of the present-day liners. This vessel proved a failure financially, as the venture of building her was about 50 years ahead of its time. She was also very much underpowered for her size. The Great Eastern was 680 feet long, and after this attempt at large building the transatlantic

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Deck Officers' Licenses

The following list shows the licenses granted during the month of September to deck officers of the merchant marine at Pacific Coast offices of the Bureau of Marine Inspection and Navigation. For key to abbreviations see footnote.

Name and Grade	Class	Condition
PORTLAND		
Harold C. McNaught, Master	OSS & OMS, any GT	RG
John C. Philippsen, 2nd Mate	OSS & OMS, any GT	RG
Stanley J. Mason, 3d Mate	OSS & OMS, any GT	O
Joseph W. Deckover, 3rd Mate	OSS & OMS, any GT	O
Delmar C. Redding, 3d Mate	OSS & OMS, any GT	O
John Dawson, 2nd Mate	OSS & OMS, any GT	RG
SAN FRANCISCO		
Victor J. Dray, Master	OSS, any GT	RG
Laurence J. McDonald, Master	OSS, any GT	RG
Norman M. Carmichael, Master and Pilot	OSS, any GT	RG
A. Austin Curtice, Master and Pilot	OSS, any GT	RG
Henry W. Marquardt, Master and Pilot	OSS, any GT	RG
Andrew Devine, Chief Mate	OSS, any GT	RG
William C. Gill, Chief Mate	OSS, any GT	O
Robert C. Wilson, Chief Mate	OSS, any GT	RG
Richard J. Williamson, Chief Mate	OSS, any GT	RG
William H. Aguilar, Chief Mate	OSS, any GT	RG
George A. Wilson, Chief Mate	OSS, any GT	RG
Edwin E. Griffitts, 2nd Mate	OSS, any GT	O
Paul A. Bane, 2nd Mate	OSS, any GT	RG
Richard G. Tatterson, 2nd Mate	OSS, any GT	RG
Gordon J. Pollard, 2nd Mate	OSS, any GT	RG
Haakon Petersen, 3d Mate	OSS, any GT	O
Karl A. I. Brunberg, 3d Mate	OSS, any GT	O
Thomas E. Armstrong, 3d Mate	OSS, any GT	O
SEATTLE		
Donald D. Hesler, Chief Mate	OSS, any GT	RG
Austin R. Wentworth, Chief Mate	OSS, any GT	RG
Philip W. Mallard, Chief Mate & Pilot	OSS, any GT	RG
SAN PEDRO		
Lester Lee Carroll, 2nd Mate	OSS, any GT	RG
William Herin, 2nd Mate	OSS, any GT	RG
Otto Wach, 2nd Mate	OSS, any GT	RG
Kenneth A. Shannon, 3d Mate	OSS, any GT	O
John G. Young, 3d Mate	OSS, any GT	O

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Fireproof *Corkboard* Insulation

An Interesting Experimental Installation Promises Great Efficiency

Interior of refer chamber on Lurline being inspected by Geo. H. Freear

Your reporter has just discovered that "there is something new under the sun." In discussing some of the latest marine practices with Mr. L. Westling of the Matson Navigation Company and Mr. Geo. H. Freear of the Van Fleet-Freear Company, he learned that they have developed an entirely new type of construction for cargo refrigerators aboard ship.

The Matson Navigation Company, through long experience in carrying perishable cargoes, is apparently convinced that nothing can take the place of a high grade corkboard in meeting the peculiar requirements for insulating refrigerated spaces on shipboard. In the past the great majority of refrigerator installations have employed extensive use of wood and combustible cements, both of which materials have been frowned upon by the recent committees of this, that and the other, who are trying to make our ships immune from fire and other sea perils.

Interior of refer chamber on Lurline. Note complete seal established by insulation. Temporary covering on floor.

During recent months the engineering department of the Matson Navigation Company, in collaboration with the Van Fleet-Freear Company, California representatives of the Armstrong Cork & Insulation Company, have produced a design and developed a method of construction of fire resistant insulation using fire resistant corkboard enveloped by fireproof enclosures, which should meet the new Government regulations.

The molasses carrier Makaweli, recently placed in commission by the M. N. Co., was the experimental ground for this type of construction, and the results were encouraging enough to prompt the owners to apply the same method in the construction of three new cargo refers on their passenger liner Lurline. The 3 compartments, totaling approximately 12,000 cu. ft., were installed during the vessel's recent annual layup period, the refers being completed in 2 weeks' time, which is a new record for speed in building re-

frigerators of this size.

Our illustrations show the interiors of the new refrigerated spaces on the Lurline. This insulated compartment consists of a central chamber and two wing chambers. The entire space is first enclosed in a steel housing completely welded practically air tight with no openings except the doors to the three chambers. The steel inner surface is then completely insulated with Armstrong low density corkboard laid up in a liquid waterproof cement. While this cement has shown on tests to have an adhesive strength of 200 pounds per square foot, the direct weight of the corkboard on the deckhead on the Lurline does not exceed 6 pounds per square foot.

Three layers of corkboard were used in the deckhead and two layers on all bounding walls and deck, and no granulated cork was used. The inner surface of this continuous cork lining on the walls and ceiling was coated with a special waterproof cement, faced with a fire resistant asbestos hard wallboard and treated with two coats of shellac. The cork on the deck was covered with the same waterproof cement and covered with a light aggregate concrete, mixed according to a special formula with a proved waterproof Portland Cement and reinforced with a two-inch square wire mesh.

The result of all this work is an air proof, moisture proof, fireproof, and vermin proof insulation.

The fire-resistant qualities of corkboard made with a natural resin binder are well known to experienced refrigerating engineers. In many fires it has been proved that this type of corkboard, subjected to intense flame action, will carbonize slightly on the side next the flame but will not burn under such conditions.

Under test these new refrigerator chambers on the Lurline were brought down to the desired temperature very promptly and maintained at that temperature on a lower refrigeration load than is necessary with the former refer chambers.

Performance at sea of these two installations will be watched with great interest because insulation of this type takes many of the hazards and troubles out of refrigeration on shipboard. Among the difficulties eliminated are:

Finished refer chamber on Lurline with floor grating, wall pipes, wall baffles, cold air circulation and meat racks in place.

(1) Fire hazard of wood structure;

(2) Maintenance of wooden members against constant tendency to rot under ordinary refrigeration chamber conditions;

(3) Leakage of heat through joints and cracks; and

(4) Difficulties in keeping inner surface in a clean, sanitary condition.

Besides producing a highly efficient insulation, the method of construction permits of rapid installation and at a cost comparing very favorably with the now obsolete wooden framed structures.

Book Reviews

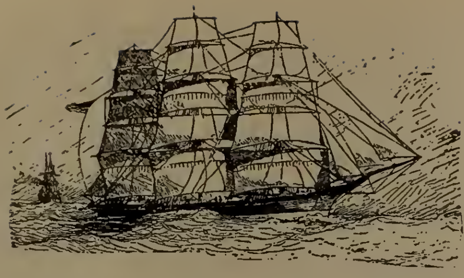
Hydraulics, by R. L. Daugherty, A.B., M.E. The fourth edition of a standard collegiate textbook on practical fluid mechanics, 460 pages, 6 x 9, fully illustrated and with many diagrams and tables, published by McGraw Hill Book Company, New York.

R. L. Daugherty is professor of mechanical and hydraulic engineering at the California Institute of Technology in Pasadena. He brought out his first edition of this book 21 years ago, and the subsequent editions have been the results of gradual development and enlargement of that text.

The subject is covered very thoroughly in terse, clear style. Each chapter is followed by a group of problems based on the theory and application developed in the chapter.

This fourth edition covers theory and practice up to date. It is of particular interest to Pacific Coast readers because many of the described practical applications of hydraulic theory are Pacific Coast applications, including pumps for the new Los Angeles aquaduct from Boulder Canyon Dam and the latest high head hydraulic power plants in the Sierras.

Marine engineers will find in this book very helpful treatment of the theory and practical design of centrifugal pumps and of the flow of liquids in piping systems.



Pacific Ocean Shipping and

A Survey of the Month's Developments

Far Eastern economic conditions reflect in a very graphic way the effects of the Japanese invasion of China. There is great and increasing congestion of cargo at Hongkong. Upwards of 150,000 tons of Shanghai-bound shipments were in store there as of October 15. Shanghai shipments are going in and coming out in three ways. Rail from the south, which is very uncertann; by sea through the very uncertain schedules of two British coastwise services; and by Chinese canal junk service, fairly sure but very slow and involved, through the intricate system of inland waterways connecting the South and Central China river systems.

Foreign trade of Japan for the first ten days of October showed decline in practically all major exports and majority of imports except pulp, hemp, and sugar. Unfavorable trade balance since first of year was 733,193,000 yen, as compared with 191,368,000 for the same period last year. Importers of superphosphate of lime advised that import quota of 1,000,000 tons for this year will be reduced to 250,000 and imports next year substantially cut.

● North Pacific Coast Ports.

The North Pacific charter market still has a very bullish tendency, although rates have risen more than 100 per cent during the past twelve months. On time charters owners are asking 12 to 15 shillings for modern motorships on a long time basis. A year ago foreign flag carriers could be had on comparable rates of 3/6 to 5 shillings. American tonnage is now quoted from $2.25 up, as compared with 75 cents to $1.00 12 months back.

Grain rates to U. K. ports are 40 to 45 shillings and lumber rates 105 to 110 shillings, the latter figures representing a rise of 15 shillings in 30 days.

Transpacific shipping is practically stagnant, but lumber is moving in increasingly larger volume to Australia, Peru, Chile, Argentina, and Hawaii. Intercoastal and European lumber shipping is below normal, but inquiry is getting much more active and prospects are good.

A Monthly Review of Tanker Markets

Williams, Dimond & Co., Oscar J. Beyfuss, Mgr., Chartering Department

San Francisco, Oct. 16th.

● Time Charters

Several motorships have again been fixed at 8/3 and 8/9 for three years; 15/- was done for one year, prompt delivery. A diesel gets 9/- for two years, beginning about February.

● Voyage Charters

AMERICAN — Gulf to North of Hatteras: The latest in this market was fuel oil at 34c and crude at 29c basis 30 gravity. Clean charters are ranging around 32c.

Intercoastal: No transactions announced.

FOREIGN—Gulf to U.K./Continent: Clean charters were numerous and done around 26/- and down to 25/-. Dirty rates are 24/-.

California to U.K./Continent: Four clean fixtures have been announced during the month all at 40/-.

Black Sea to U.K./Continent: Clean tonnage was taken at 24/- and 25/6, dirty at 18/- and 23/6.

Black Sea-Far East: None, but Bahrein/Japan was done at 35/- for a dirty boat.

California-Australia and New Zealand: A clean boat gets 42/6 while a dirty boat loading at Bahrein gets 47/-.

California-Far East: A great deal of dirty chartering has been done to Japan. The highlights are many fixtures for three and six consecutive voyages, rates ranging from 30/- to 33/-. Single voyages went up as high as 33/6 and Gulf/Japan was done at 41/6.

Tanker Construction

Lloyd's Register of Shipping has just published its list of tankers under construction in the world as of the 30th of September and the number is 95, exactly the same number under construction at the end of June. The total gross tonnage of these 95 vessels the end of last month is 727,049; a year ago there were 82 with a gross tonnage of 655,236.

It has been nearly a decade since so many tankers were being built. The last comparable figure was in the spring of 1931. According to our records this is the first time in nearly twenty years that the United States leads other countries in the total gross tonnage of tankers under construction, and that only by a narrow margin of 7,000 tons. Considering the United States' position as a producer and exporter of petroleum and its products, it would seem there is still room for expansion in tanker construction in U. S. shipyards.

Pacific Coast Port Notes

in the Pacific Maritime Industry

● **Panama Canal Traffic.**

The transits of vessels through the canal during September, 1937, decreased 11.2 per cent, as compared with August, 1937, and 6.8 per cent as compared with September, 1936. The tolls in September this year totaled $1,939,763.36, and those for the previous month amounted to $2,199,279.54.

● **Motor Vehicles in Japan.**

There is a marked shortage of motor vehicles for commercial and private use in Japan, due to the commandeering for military use of all used cars in the market and of the entire domestic production of commercial vehicles. It is apparent that this will stimulate a very active demand.

● **Tung Oil a Problem.**

American consumption of Chinese tung oil in 1936 was approximately 119,000,000 pounds. The present conditions in North and Central China are shutting off practically the entire producing area. Normally the movement at this time would top 10 million pounds a month. In August 2,000,000 pounds came out. Some 300,000 pounds of that amount were diverted over the Hankow-Canton railway for transhipment at Hongkong because of conditions at Shanghai. On September 1 there were 60,000,000 pounds in America, sufficient to last five months at the present rate of consumption.

● **Malayan Rubber Trade.**

British Malaya exported 64,863 tons of rubber during August, of which 36,780 tons came to the United States.

Absorption of crude rubber production through domestic manufactures in the principal producing countries has increased an average of 56 per cent during the first half of 1937. The total of this absorption, 7600 tons, is not yet significant, but the rate of increase indicates a notable trend.

● **Trade Regulation Changes.**

Effective October 15, 1937, Chile has raised the import duty on a number of commodities, including rough pine lumber, mineral oils, paraffin wax, wood pulp, and flat glass, which are of interest to Pacific Coast.

Effective October 10, 1937, Japan has restricted importation on a long list of commodities, of which the following are of interest to Pacific Coast exporters: Raw cotton, wool and lumber. She has also prohibited importation on several hundred items, including chewing gum, photographic apparatus, canned fruits, dried milk, plate and sheet glass, bromide paper, photographic dry plates, and radio receiving sets or parts

Effective September 15, 1937, Mexico substantially increased the import duties on animal and vegetable oils and greases, wheat and flour.

● **Good Year in Hawaiian Pines.**

The present pineapple season in Hawaii is probably the most successful in the history of that industry. Shipments of canned fruit and juice have totaled nearly 19 million cases since the first of the year. The largest producer and packer has announced plans for the immediate expenditure of $1,250,000 for expansion and improvements, including a new factory for processing and canning juice.

● **Iron and Steel Exports**

In August the remarkable flow of exports of ferrous metals continued with only a slight recession from the record shipments of July. Excluding scrap, the total for August was 408,023 tons, valued at $24,117,363. Breaking down this total we find, in items of over 20,000 tons, totals: Pig iron, 114,035 tons (320 tons in August 1936); steel ingots, 69,300 tons (1303 tons August, 1936); heavy plate, 55,034 tons (7,542 tons August, 1936); tin plate, 29,170 tons; and black steel sheets, 28,075 tons.

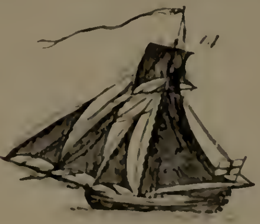
Scrap iron and steel and tin plate scrap exports in August reached a new high record of 479,296 tons, valued at $9,305,239, as compared with 428,047 tons, and $8,931,694 for the previous month. The average export price of this scrap for the first eight months of 1937 has been $19.90 a ton, as compared with $12.31 per ton for the same period in 1936.

● **Pepper Imports Increase.**

During the five-year period 1931-35 the total United States imports of black pepper averaged 13,715 metric tons per year. During the year ending May 1, 1937, the imports of this commodity from Netherlands Indies alone ran up to 32,367 metric tons. The Netherlands Indies has had two successive bumper crops, and the American dealers are evidently stocking up at lower prices.

● **Alaska Fur Seals.**

The annual computation of the fur seal herd under Federal supervision in Alaska shows a total of 1,839,119 animals on August 10, 1937, as compared with 1,689,743 for the same date in 1936, and with 130,000 in 1910. During this 27 years of restoration 768,792 surplus males have been killed and their skins sold for the account of the Government.



Shipping Calendar

October, 1937

October 1—A.F. of L. Teamsters' Union calls off its four weeks' embargo on cargo handled by C. I. O. International Longshoreman's Association members, and full activity is resumed on San Francisco's Embarcadero and piers.

October 2—U. S. Maritime Commission announces that it will pay $50.00 bonus in cash to all officers and members of crews on U. S. Government-operated merchant vessels entering war zones of Spain or China.

October 3 — Chinese completely block the Pearl River below Canton and allow no boats to pass. All Hongkong-Canton sailings cancelled.

October 4 — Arrivals at San Francisco during September totaled 396 ships, with an aggregate net tonnage of 1,410,892. Departures totaled 400 ships with a net tonnage of 1,403,183.

October 5—California port cities' Chamber of Commerce join in movement to avert the threatened diversion of Panama Pacific liners from the New York-California to the New York-South America run.

October 6—Seattle Port Commission announces plans for a giant modern and complete steamship terminal on the site of the old Skinner and Eddy shipbuilding plant. This will involve two piers 1000 feet wide and 400 feet long.

October 7—The Mexican Government decides to purchase ten passenger and cargo vessels for coastwise service on Gulf of Mexico and on the Mexican Pacific Coast.

October 8 — The French Line announces inauguration of a new refer service direct from Pacific Coast ports to French North Atlantic ports, with the maiden voyage of the completely refrigerated motorship Guadalupe.

October 9—In September a total of 493,516 tons of cargo, valued at $15,006,012, passed over the wharves at the port of Los Angeles. Bulk petroleum shipments totaled 6,120,261 barrels and lumber receipts 67,701,000 board feet.

October 10 — Marine Department, San Francisco Chamber of Commerce, Abe Marks, manager, completes compilation of a record of major marine casualties on the Pacific Coast during the past 30 years.

October 11—Propeller Clubs of the United States, meeting in Memphis, Tenn., pass a resolution demanding immediate Government action to clear the American Merchant Marine of "radical elements."

October 12 — S. W. King, congressional delegate from Hawaii, makes a formal appeal for protection of commerce to Alaska, Hawaii, and Puerto Rico, in the event of any future waterfront strikes in continental United States.

October 13—Oceanic and Oriental Navigation Company dissolves its corporation and allots its 12 vessels equally between the Matson Navigation Company and the American-Hawaiian Steamship Company.

October 14—The Grace Line announce their purchase of the ships and trade of the Red D. Line, seven vessels and a well established business and good will in the Caribbean trade out of New York.

October 15 — The "Evening Navigation School" at the Ferry Building, San Francisco, graduates five navigators and starts a new beginners' class. For 20 years the Department of Education of the city of San Francisco has maintained this school to help American seamen get ready for license examinations.

October 16—The Arrow Line cargo carrier Barbara Cates, of 5599 tons gross register, is sold by Sudden and Christenson to the Waterman Steamship Corporation of Mobile, Alabama.

October 17—Operators of tank vessels are warned by the Bureau of Marine Inspection and Navigation that the terms of the latest Safety at Sea Act will be strictly enforced and full penalties assessed for all violations. Joseph Bruce Ismay dies in London.

October 18—Consolidated Whaling Corporation of Victoria, B.C., issue report of their season's work in the North Pacific. Their catch was 317 whales, as compared with 376 whales in 1936.

October 19—The 5586 gross ton freighter West Mahwah, aground near Pigeon Point July 9, refloated next day, and idle since, is sold by the McCormick Steamship Company to Pacific Coast Shipwrecking and Salvage Co.

October 20—United States Chamber of Commerce in Argentina announces its "unqualified support" of the proposal to divert Panama Pacific liners from the California run out of New York to the Buenos Aires run.

October 21—The Propeller Club of San Francisco holds its annual golf tournament on the Lake Merced course. For results see page 58.

October 22 — American-Hawaiian Steamship Company prefers charges before the Bureau of Marine Inspection and Navigation against five members of the crew of the steamer Golden Bear, involving insubordination for refusal to handle tug lines because the towboatmen were not members of the Sailors' Union of the Pacific.

October 23 — The U. S. Maritime Commission sells 22 of its obsolete ships on the Atlantic Coast for $991,111.93. Of these vessels 18 are to be scrapped and four are to be operated in the Mediterranean under Greek ownership.

October 24 — The U. S. Maritime Commission publish minimum wage and manning scales for American flag vessels receiving operating subsidies. These scales are practically identical with those now used on the Pacific Coast.

October 25 — Flood Bros. of San Francisco sell the motorship Samoan, 3375 tons gross, to Odd Goodyar of Oslo, Norway. Her name will be changed to Norse Lady.

October 26 — Dollar Line announces a progressive program of modernization of all of its "502," round the world, and "535," New York-Orient, liners to conform these ships to the latest Safety at Sea rules. This will be done without interruption to schedules.

October 27 — Navy Day. Marked by open house receptions on units of the Pacific fleet in all principal Pacific Coast ports.

October 28 — New Japanese cargo liner Asakasan Maru arrives at Los Angeles from Yokohama, 4839 nautical miles, in 11 days, 16 hours, an average of 17.38 knots. After discharging 500 tons, mostly silk, she continued to New York.

October 29—The Bureau of Marine Inspection and Navigation warns American ship operators that it intends to make a drive against all passenger liners that are not fully up to the latest Safety Rules.

October 30—Mr. and Mrs. J. S. Hines, publishers of Pacific Marine Review, leave San Francisco on their annual six months' business trip to the Atlantic Coast.

October 31—This is the close of the Annual Book Drive Week for Seamen's Libraries. However, if you have not sent in those books, do not hesitate; just wrap them up, mark the package "Seamen's Library," and leave them at any branch Public Library.

Foreign Trade on the Pacific Coast

MONTH OF AUGUST

Customs Districts	Exports 1937	Exports 1936	Imports 1937	Imports 1936
San Francisco	$13,657,576	$12,628,786	$ 8,596,886	$ 7,104,141
Los Angeles	9,329,226	7,607,137	6,805,525	8,711,722
San Diego	1,168,493	345,411	158,167	188,671
Total California	$24,155,295	$20,591,337	$15,560,778	$16,004,534
Oregon	2,201,967	1,576,058	1,144,059	697,565
Washington	8,038,642	6,058,570	3,154,743	2,768,526
Total Pacific Coast	$34,395,904	$28,225,965	$19,859,580	$20,470,625

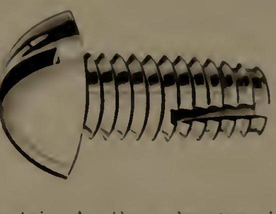
EIGHT MONTHS ENDING AUGUST

	Exports 1937	Exports 1936	Imports 1937	Imports 1936
San Francisco	$83,871,277	$67,162,242	$64,364,767	$56,505,903
Los Angeles	92,370,389	62,876,386	57,018,954	47,907,172
San Diego	5,604,533	2,849,986	2,797,658	1,924,920
Total California	$181,846,199	$132,888,614	$124,181,279	$106,337,995
Oregon	15,303,071	11,506,828	7,976,915	6,431,442
Washington	59,916,858	40,900,530	28,611,487	25,045,340
Total Pacific Coast	$257,066,128	$185,295,972	$160,769,781	$137,814,777

Preliminary figures subject to revision
Released by John J. Judge, District Manager
Bureau of Foreign & Domestic Commerce
311 Customhouse, San Francisco, California

Thread Cutting Machine Screws

The Shakeproof Lock Washer Company has recently announced the development of a screw that actually cuts its own thread in metals and plastics of practically any thickness. Its patented, thread-cutting slot, plus a special hardening process, eliminates the separate tapping operation normally required in the use of standard machine screws. Important production savings in both labor costs and time are assured by the use of this new fastening method and, because the screw remains in the threads it has cut, a better fastening



is certain. Another advantage is the fact that, should it ever be necessary to replace the screw, an ordinary machine screw of the same size will fit its threads.

Bethlehem Delivers Three Super Trawlers

Launched on September 23 and delivered during October were three super trawlers, Annapolis, West Point, and Yale, built by the Fore River Plant, Bethlehem Shipbuilding Corporation Ltd., for the General Sea Foods Corporation.

These trawlers are exact sisters, 147 feet overall length, 26 feet beam, and 13 feet 4 inches loaded draft. They were designed by John G. Alden of Boston on Maierform hull lines, and conform to the highest classification of the American Bureau.

Each power plant comprises a 650 brake horsepower Cooper Bessemer diesel engine rated at 260 r.p.m. and directly connected to a single screw propeller, which gives these boats a sea speed of 12.4 knots.

A 140 horsepower Cooper Bessemer diesel direct connected to a Diehl generator provides power for the trawl winch, which has a capacity for 600 fathoms of cable on each drum.

Main engines have following attached units: salt water circulating pump; fresh water circulating pump; bilge pump; fuel service pump; 25 K. W. electric generator for lights; and an air compressor. This arrangement renders the plant self contained while under way.

The fish holds are lined with steel plate covered with 20 per cent nickel cladding. All joints in this lining are lap welded with nickel welding rod. All joints in hull are riveted.

Innovations are the stiff-legged tripod masts of galvanized steel tubing and the tempered plate (unbreakable) glass used in windows.

Total cost of the 3 trawlers was $800,000.

Condenser Tubes and Plates

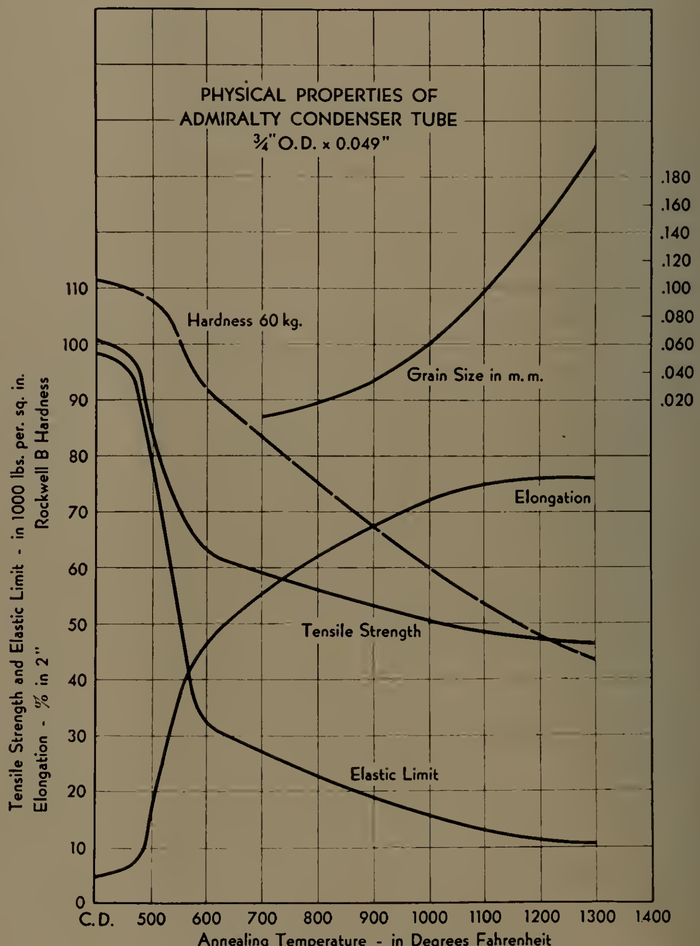
Revere Copper and Brass Incorporated has a long and interesting history that contacts many major developments in American marine engineering and naval architecture. Founded in 1801 by Paul Revere of the "famous ride," as the first copper rolling mill in America, it furnished the sheets to resheathe the frigate Constitution and the plates to fashion the copper boilers for Fulton's steamer Clermont.

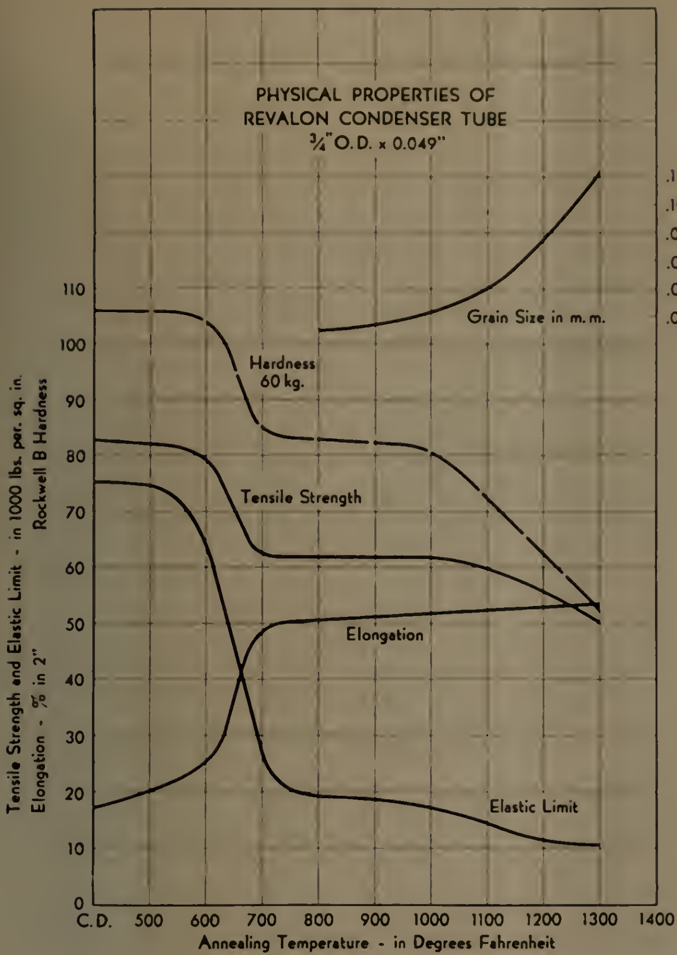
Through the years Revere has kept pace with technical developments and today operates six of the most modern copper and brass mills in the United States, located at Rome, New York, Baltimore, Detroit, Chicago, Taunton, Massachusetts, and New Bedford, Massachusetts.

The modern tempo of engineering development invading the marine field has raised some very difficult maintenance problems. Demands for greater speed of ships multiply required horsepowers very rapidly. Space and weight are prime considerations on shipboard, where every pound of displacement or cubic foot of space released to propulsion machinery is so much net revenue taken away from the passenger or cargo traffic manager's department. It has therefore become customary to design heat exchange apparatus such as condensers, lube oil coolers, or fuel oil heaters with a high rate of heat transfer calling for rapid circulation of cooling or heating mediums and thin wall sections on the transmitting tubes or plates.

This trend has forced much research on the technical departments of manufacturers, and has brought about the introduction of new alloys and new shop technique for condenser tubes and sheets. This movement began about 1890 in naval installations and a little later in the merchant marine service. Prior to 1860 it was customary to use brazed copper tubes in surface condensers. In that year seamless copper tubes began to displace the brazed variety. In 1870 the British Admiralty specified a composition of 70 per cent copper and 30 per cent zinc. About 1890 this specification changed to 70 per cent copper, 1 per cent tin, and 29 per cent zinc, was named Admiralty brass, and became practically standard for condenser tube use.

With the increasing burdens imposed on condenser tubes by the modern tempo, new alloys were developed to meet impingement and erosion attacks of high velocity salt water.





Admiralty brass tubes are still satisfactory in many applications afloat and ashore, but in many modern condenser installations where the cooling medium is especially corrosive or the velocity of circulation is high, the Admiralty mixture has been found inadequate. Often a more costly special alloy tube will prove much more economical in the long run than the more reasonably priced Admiralty brass.

Each condenser installation is a special problem, in which the right selection of the proper alloy for the tubes depends on a careful consideration of several important variables, including: Chemical composition of cooling water; velocity of cooling water in tubes; the possibility of air entrainment; the presence of suspended solids; and the temperature of operation. The development of any given special alloy for condenser tubes is usually with the objective of producing a tube that will not be subject to dezincification, and will have a tough protective surface film capable of high resistance to erosion and impingement attacks. When such an alloy has been developed in the laboratory there immediately follows the problem of production on a commercial basis involving design of special tools and of mill and shop technique.

Our illustrations show the physical characteristics of Revalon and of Admiralty Brass condenser tubes as taken from samples of Revere mill run in these two alloys.

Revalon is an aluminum-copper alloy whose chief characteristic is its property of forming a tenacious self-healing surface film of aluminum oxide which renders the tube highly resistant to impingement attack. It is therefore valuable in condensers for marine service where cooling water velocity is high or where Admiralty brass tubes have failed as a result of impingement attack or of erosion.

All Revere condenser tubes are made with great care. Briefly, the process is as follows: Alloys are prepared from the highest grade metals, and are cast into billets. Billets are cut to predetermined lengths, and are brought to red heat in a furnace. The red hot billet is then extruded into a heavy tube in a 1650 ton hydraulic press. The extruded tube is then reduced to the desired size and gage either by roller forging or by drawing. Finally, all tubes are electrically annealed to a uniform grain size.

These operations vary somewhat for each alloy, but all are under complete metallurgical and mechanical control. The product after completion is subjected to rigorous inspection and is guaranteed to be uniform to a degree.

Condenser tube plates are produced by rolling cast cakes to the required gage and then trimming them to size either as squares, rectangles, circles, half circles or segments. Revere can supply condenser plates in Muntz Metal, Naval Brass, Admiralty Brass, Manganese Bronze, Cupro Nickel or Herculoy. Plates can be furnished: In squares or rectangles up to 110 inches in width; in circular or curved patterns up to 112 inches; and in weight up to approximately 9000 pounds.

A technical advisory service is available to any manufacturer or user of condensers.

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

Contract Awarded for U. S. Lines Passenger Liner

On October 21 the United States Maritime Commission signed the largest contract for a single commercial vessel ever let to an American shipyard when that body closed with the Newport News Shipbuilding and Dry Dock Company to build the cargo passenger liner which is to run alongside Washington and Manhattan in the North Atlantic service of the United States Lines Company of New York. This contract is the first to be awarded by the Maritime Commission under the shipbuilding subsidy provisions of the Merchant Marine Act of 1936.

The contract calls for building and equipping the vessel for $15,750,000, and in 852 days. The contract figure is on an adjusted price basis, to allow for possible increase of labor and material costs up to 15 per cent. It was determined by the Commission that such a ship could now be built in Dutch yards on a firm price of $10,500,000. On this basis a 33-1/3 per cent subsidy was granted with the understanding that any rise in labor and material costs would be absorbed by additional subsidy. Under the new rules the owners will be required to pay the first 25 per cent, or $3,937,500; the Maritime Commission pays 33-1/3 per cent, or $5,250,000, outright; and the balance, or $6,562,500, is paid by the Maritime Commission as a loan to the owner amortised over a 20-year period at a moderate interest rate.

The liner thus to be built will have the following general characteristics, the second figure in each case being the same measurement for S. S. Manhattan:

Length O. A.	723—705 feet
Beam	92—86 feet
Depth P. Deck	75—75 feet
Displacement L. D.	34,000-33,500 tons
Passengers	1,200—1,239
Crew	630—478
Speed	Estim. 22 knots
	Trial 22.22 knots

This comparison is very interesting. The figures for Manhattan are official as of August 1, 1932, the approximate date of her delivery. Dimensions, of course, are still the same, but if the Maritime Commission present estimate is correct, here is practically a sister ship with a passenger list somewhat smaller and a crew 32 per cent larger. It would be interesting to the shipowner to know just how the extra space for crew quarters was obtained. This large increase, if correct, may have to be matched on the other two vessels, which would mean a tremendous added expense.

It is interesting also to note that the new vessel on considerably larger overall dimensions has only 500 tons more displacement. This is probably due to use of high tensile steels, more welding, and higher pressure steam machinery.

This contract is chiefly significant as the opening of a large shipbuilding program planned by the Commission. Let us hope that the next contract will not be so long delayed as this one.

New Construction Contemplated

It is reported from variously authoritative sources that quite an array of plans and specifications for vessels to be built under the Merchant Marine Act are being worked over by several steamship lines and by the experts of the American Bureau, the Bureau of Marine Inspection and Navigation, and the Maritime Commission. Among these are:

Three or more 18 knot cargo steamers of approximately 18,000 tons displacement and 485 feet long, for the Black Diamond Line, New York.

Three combination passenger and cargo vessels for the American Export Lines, New York.

Two passenger and cargo vessels, 17½ knots, 8,270 gross tons, for New Orleans—River Plate service.

Five to 7 passenger and cargo vessels for Pacific - Argentine - Brazil Line, San Francisco.

Four to 6 combination passenger and cargo vessels for the American-South African Line, New York.

Three to 4 combination passenger and cargo vessels for the New York-London and New York-Liverpool service of the United States Lines.

● Contract for Large Fireboat

United Shipyards Inc., Staten Island, New York, report a new contract, their Hull Number 856, for $924,000. This will be a diesel-electric vessel, 134 feet long overall, 32 feet

molded beam, 13 feet 6 inches molded depth, built to plans and specifications prepared by Gibbs & Cox, naval architects, New York.

It is estimated that keel will be laid March 22, 1938, hull will be launched June 28, 1938, and vessel will be delivered August 20, 1938.

● Levingston Gets New Contracts

The Levingston Shipbuilding Company, Orange, Texas, report new contracts covering:

Two all welded steel hull towboats 64 feet 11 inches by 18 feet by 7 feet 6 inches, powered with 380 brake horsepower Atlas Imperial diesel engines; and six all welded steel oil barges, 173 feet by 39 feet by 8 feet 6 inches—all for the Pan American Petroleum and Transport Co. of Texas City, Texas.

Tanker Launched at Sparrows Point

On Saturday, October 9, at 11:00 a.m., the Gulfwave, new tanker of Gulf Oil Corporation, slid down the ways at the Sparrows Point, Maryland, plant of Bethlehem Shipbuilding Corporation. Mrs. J. F. Drake, Jr., substituted as sponsor for her sister-in-law, Mrs. Chester H. Lasell, who was unable to attend on account of illness. Mrs. Lasell, the former Ruth Drake, is the daughter of Colonel J. F. Drake, president of Gulf Oil Corporation.

Gulfwave is the 314th vessel, and the 39th tanker, launched at Sparrows Point. She is the third of four 11,000-deadweight ton tankers built for Gulf at Sparrows Point, and is identical with the two already completed, except for greater use of welding. Her overall length is 442 ft., molded beam 64 ft., and designed draft 27 ft. 6 in. She will carry a cargo of about 3,500,000 gallons and will be used principally for the run between Gulf Coast ports and the Eastern seaboard. Power for propulsion will be provided by a set of cross-compound, double-reduction geared turbines of General Electric manufacture, driving a single propeller 17 ft. 6 in. in diameter at about

78 r.p.m. The turbines will develop 3000 shaft horsepower at normal speed and are expected to drive the ship at about 12 knots. Gulfwave represents the latest in tank steamship design. She is built on the Isherwood bracketless system of framing along arcform lines. Crew and officers will total 38. Entirely fireproof construction, with steel berths, steel furniture and steel fittings, is used in the quarters both for crew and officers.

Keel for another tanker is being laid immediately on the ways used for the Gulfwave. In addition five other tankers, in various stages of progress, are under construction at Sparrows Point.

Federal Launches Large Tanker

Esso Bayway, third of ten new oil tankers in a $16,000,000 building program of the Standard Oil Company of New Jersey, slid down the ways of the Federal Shipbuilding and Dry Dock Company, subsidiary of the United States Steel Corporation, Kearny, N. J., at 11:45 a.m., October 9. Oil and steamship company officials, some 2,000 employees and friends, watched the launching.

Similar in construction to a sister ship launched by the same yard last July, the oil burning Esso Bayway is 450 feet long, has a deadweight capacity of 13,000 tons, a cargo capacity of over 4,400,000 gallons, and a sea speed of over 12 knots.

Miss Agnes I. Maloney of Elizabeth, N.J., a Standard Oil employee for 19 years and at present registered nurse in charge of welfare work at Standard's Bayway Refinery, was sponsor. Miss Elizabeth Henry of the same city was maid-of-honor.

The new ship is modeled after two tankers built experimentally on the Isherwood Arcform design in 1934 by Federal and sold before half completed. Federal Shipbuilding and Dry Dock Company was awarded contracts for the first four of Standard's 10 tankers in July, 1936, and expects to launch the remaining two in the near future.

October Active at Sun Yard

The Sun Shipbuilding and Dry Dock Company yard had a busy launching season in late September and October.

On September 26 they launched Hull No. 164, the first of two 12,000 dead-weight ton diesel engined tankers for the Texas Company, and delivered her on October 16. Hull No. 165, the second motor tanker for the Texas Company, was launched October 19.

Hull No. 161, first of two 12,900 deadweight ton steam tankers for the Standard Oil Company of New Jersey, was launched on October 2 and delivered October 16. Hull No. 162, the second of these tankers, was launched October 30; will be delivered about November 13.

Keel was laid October 11 for Hull No. 169, an 18,500 deadweight ton steam tanker for Atlantic Refining Company.

The work on the two 12,800 ton steam tankers for Standard Oil of California is well under way. First of these, Hull No. 166, will be launched December 4 and delivered December 26. The second, Hull No. 167, will be launched January 15 and delivered about February 20.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Completion date March 1, 1938. **Hull 5356—Maury (DD401)**; completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341' 3⅝"; beam, 35' 6⅛"; depth, 19' 8". Cost $3,675,000.

DRYDOCK AND ROUTINE REPAIRS: **M.S. Limerick, Haviside Barge No. 5, Talamanca, Pres. Pierce, Condor, Pres. Wilson, Herbert L. Pratt, Antigua, Yorkmar, Santa Rosa, Chiriqui, Pres. Hoover, Lebec, Bahrein, Charcas, Wm. Burton, Baldhill, M.S. Inneroy, Silverado, Stm. Sch. Caspar.**

GENERAL ENGINEERING & DRY DOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Gas S. Sea Queen, Tug Contocook, Barge Red Rock, Mapele, Noyo, Tug Reliance, Gas. S. Lina B.**

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80' U. S. Coast Guard patrol boats; 1,600 H.P. each;** Liberty-Vimalert **conversions; speed 30 m.p.h. Keels laid September, 1936; launching dates September 11, October 23, November 10 and 25; estimated completion dates October 4 and 30, November 15 and 30, 1937.**

Two 78'x20'x9'6" Lamparo fishing boats; New Conti Savoia for S. Russo and partners, powered with 240 H.P. 6 cylinder Fairbanks diesel; New Limited for Claro Sima and partners, powered with 210 H.P. 6 cylinder Western diesel. **Launching dates September 4 and 18; completed October 20 and 30, 1937.**

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: **Ferry Mercer, Lightship Relief.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

NEW CONSTRUCTION: **Hull No. 57,** one steel harbor barge 139' x 40' x 14'; 8,200 bbl. capacity; for General Petroleum Corp. of Calif. Delivery date, January, 1938.

DRYDOCK AND ROUTINE REPAIRS: **Lawrence Philips, Korrigan, III, Montebello, Yacht Maria Delores, M.V. Eknaren, M.V. John Knudsen, Olympic, Golden Sun, Capt. A. F. Lucas, Kollgrim, Alice Tebb, Knoxville City.**

MARE ISLAND NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION:

Henley (DD391) destroyer; standard displacement 1500 tons; keel laid October 28, 1935; launched January 12, 1937; **completed.**

Pompano (SS181) submarine; keel laid January 14, 1936; launched March 11, 1937; **estimated delivery date November, 1937.**

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); delivery date, August 1, 1939.

DRYDOCK AND ROUTINE REPAIRS: **Houston, Trenton, Richmond, New Orleans, Kingfisher, Altair.**

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: **Dredge A. Mackenzie, Santa Monica, Kailua, Georgian, San Anselmo, Gracie S, Lightship 100, Port Orford, Mannami, California, Arizonian, Golden Hind, Tashmoo, Fort Armstrong, Dorothy Wintermote, Canada, Hercules, Horace Luckenbach, Oregonian, Frances, Patterson, West Mahwah, La Purisima, Silver Yew, Manoa, Arkansan, Balboa, Star of Monterey, Western Chief, Lebec, Bessemer, Coloradan, Genoa, Yellowtail, California Star, Santa Rosalie, Modavia, Buenos Aires, Western Pilot, Dux, Fort Armstrong, Blue Water, New Ambassador, Kojan.**

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson (Destroyer No. 392); standard displacement, 1500 tons; keel laid July** 22, 1935; launched May 6, 1937; commissioned September 22, 1937; estimated completion date, November 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Nevada, Maryland, Brazos, John C. Spencer, Phelps, Porter, Oglala, Quail, Whippoorwill, Lark, Tanager, Preble, Pruitt, Sicard, Tracy.**

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: **West Notus, Pacific Pine, Mapele, Sutherland, Paul Luckenbach, Barge Sandy, M.S. Ballard, M.S. Marie Bakke, West Cactus.**

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 129, purse seine fishing boat; 78' x 20'; powered by 200 H.P. Atlas engine. Keel laid July 19; **launched September 10, 1937 delivered October 15, 1937.** Owner, Roy Hugiv, Seattle.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION:

One floating machine shop for C. C. Hunley, Cairo, Ill.; 82' x 20' x 3½'.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Two bulk lake freighters** 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Keels laid June 21, 1937; and July 6, 1937; **launching date November, 1937;** delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis and DD396 Jouett; Three** 1850-ton destroyers for U.S. Navy; date

of contract September 19, 1935. Estimated delivery dates June, August and October, 1938, respectively; launching dates indefinite; DD396, keel laid, Mar 26, 1936. DD395, keel laid July 28, 1936. DD394, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; keels laid July 15 and September 15, 1937, respectively; launching dates, indefinite; delivery dates April, 1939, and June, 1939, respectively.

Hull No. 175, Jeanne D'Arc, single screw, diesel propelled trawler for Boston, Mass., owners; delivered October 15, 1937.

Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; delivered October 31, 1937.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant, Quincy, Mass.

NEW CONSTRUCTION:

CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; launched August, 1937; estimated delivery, February, 1938.

Annapolis, West Point, Yale; three diesel drive trawlers for General Sea Foods; keels laid June 17, 1937; launched September 23, 1937; delivered October, 1937.

Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil tankers**—steam—425'x64'x34' for Gulf Oil Corp.; total tonnage 7070 each; estimated launching, first ship, October 9, 1937.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

One barge for Socony-Vacuum Oil Co., Inc.; 260 feet long; non-propelled. Delivered October, 1937.

BOSTON NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; delivery dates October, 1937, and November, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; estimated delivery dates August, 1939 and October, 1939, respectively.

DD415, O'Brien, and DD416, Walke, two destroyers; LBP 341', beam 36', depth 19'8"; delivery dates, August, 1939, and October, 1939, respectively.

DD425 and DD426, two destroyers; 341'0" x 36'0" x 19'8".

One harbor tug for U. S. Navy; 98'0" LBP x 24'0" x 13'6"; delivery date 1938.

BROOKLYN NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, Brooklyn, light cruiser, L.B.P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, December 1, 1937.

CL 48, Honolulu, light cruiser; L.B.P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935; launched August 26, 1937; estimated delivery, May 1, 1938.

CL 50, Helena, light cruiser; L.B.P. 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

CHARLESTON, S. C., NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for **one harbor tug;** LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'; keel laid August 2, 1937.

Order placed for **one harbor tug;** LOA 110' 3"; LBP 98' 0"; breadth 24' 0"; depth at side amidships 13' 6". No dates set.

Order placed for one **harbor tug;** 65 feet long.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One diesel yacht, powered by 1,000 h.p. Winton engines; 143' long, 23' beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date November 1, 1937.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION:

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100'x26' x6'6"; 320 gross tons.

Hull No. 1386; one single screw diesel towboat; for stock; 160 gross tons.

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Shipping Company; 600 gross tons.

Hulls Nos. 1427-1428, inclusive; two welded steel covered lighters 110' x 33' x 9' 6"; for Reading Co., Philadelphia, Pa.; 1120 gross tons.

Hull No. 1430; one welded steel barge 255' x 40' x 14'; for Kieckhefer Container Corp; 1600 gross tons.

Hulls Nos. 1431-1434; four welded oil barges 195' x 35' x 9' 6"; for stock; 1956 gross tons.

Hulls Nos. 1435-1439; five type W-4 welded steel coal barges 175' x 26' x 10'8"; for stock; 2360 gross tons.

Hulls Nos. 1440-1444; five type W-4 welded steel coal barges 175' x 26' x 10'8"; for stock; 2360 gross tons.

This makes a total of 22 hulls with a total gross tonnage of 10,486 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937; delivery date, January, 1938.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936 launched August 25, 1937; delivery date, March, 1938.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October 23, 1937; delivery date June, 1938.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937; delivery date June, 1939.

Hull No. 30, Saury (SS189); keel laid June 28, 1937; delivery date July, 1939.

Hull No. 31, Spearfish (SS190); keel laying date September 9, 1937; delivery date September, 1939.

Hull No. 33, Seadragon (SS194); 1450 tons; delivery date December, 1939.

Hull No. 34, Sealion (SS195); 1450 tons; delivery date February 1940.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; 1850 tons; keels laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, DD397 Benham, DD398 Ellet and DD399 Lang, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Four 12,800-ton tankers for the Standard Oil Company of New Jersey; 450' x 66'6" x 34'6"; Isherwood Arcform design of hull form and longitudinal hull framing. Hull 143, Esso Bayonne, keel laid December 16, 1936; launched July 24, 1937; delivered October 2, 1937. Hull 144, keel laid February 8, 1937; launched October 9, 1937; Hull 145, keel laid June 7, 1937. Hull 146, keel laid August 16, 1937.

Two destroyers, DD411 and DD412.

Two 12,900 ton tankers for Pan American Petroleum & Transport Co.

Hulls Nos. 149-150, two 12,900 ton tankers for Pan American Petroleum & Transport Co.; Isherwood Arcform

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Building Safety in Ships

(Continued from Page 33)

Other spaces which are oftentimes accessible only by means of access trunks are steering gear and pump rooms. These trunks generally are and should always be of such a dimension that a proper arrangement of sloping ladders and gratings can be installed. The ladders should not exceed two decks in length, and they should not be of greater slope than can be safely negotiated by a man who may have in one hand tools or supplies. The trunk should have adequate illumination and lifting gear should be installed overhead for the handling of the heavier pieces of machinery.

● Deck Openings

Deck openings are necessary evils aboard ship, not the least of which is the cargo hatch. These openings are responsible for many serious accidents. Much study has been given to this item in hopes of reducing its hazard, but little improvement has been forthcoming, due to its particular function and purpose. The depth of the weather deck hatch coaming, and its height above deck, have minimums set up by strength requirements and by load line regulation. There are practical considerations as regards these dimensions in that they affect the movement of cargo, but for safe operations this coaming should not be less than 36 inches above the deck.

The hatch coamings in 'tween deck spaces represent a somewhat different problem, in that with limited head room the coaming must be low to permit free movement of cargo to the hatch way. Consequently, when such a height is not possible the other extreme must be attained to minimize tripping hazards. Where possible 'tween deck coaming should be flush with the ceiling (planking) where laid; or, where the steel deck is bare, a low pitch ramp of steel should top the hatch angle.

When it becomes necessary to work cargo from lower levels and to leave the 'tween deck hatches open, there should be stretched tightly around the open hatches guards of chain well secured to the ship's structure.

Where hatchways must be trunked through one or more decks, and where hatch covers are used at its lower levels, the trunk should be stepped in way of the covered level with sufficient walkway to permit a man to handle strongbacks or boards without danger of falling. Should conditions make a stepped trunk impossible, a strong disappearing walkway should be installed. In either case recessed hand-holds should be provided around the sides of the trunk.

● Hatch Coverings

The development of improved hatch coverings has been a problem not easy of solution, and has in general been stalemated by practical barriers. While weather deck coverings have seen some recent improvements in the form of steel panels, the 'tween deck hatches are almost universally equipped with the conventional strongback and hatchboard assembly. Strongbacks, because of the loads and abuses to which they are exposed, are of necessity of heavy structure, and as they make the complete span of the hatch, prove to be difficult to handle. When properly built and maintained they must fit neatly into the coaming sockets and provide ample load bearing surfaces. The sockets should be so designed that it is not necessary for the strongback to be dropped into the slots to obtain full bearing. Strongbacks should be equipped with web openings and winch bridles of chain, which will prevent tipping when suspended, and a lanyard should be attached for safe control of the piece. The ends should be fitted with protected sliding bolts, which will prevent the strongback from being lifted by a draft of cargo when the hatch is worked in sections.

Many attempts have been made to improve upon the hatch covering board, but little success has been made, except perhaps in minor detail. The use of pressed metal in lieu of wood, and the capping of the ends of wood boards with iron or steel have produced hatchboards which are easily maintained and the ends of which insure good, full bearing surfaces. When practical the strongbacks should be so spaced throughout the ship's hatchways that all hatchboards will be of the same dimension and will fit in any assembly. Where hatch lengths will not easily provide this, one row of boards should be of such extreme difference that a partial landing of the ends will not be possible.

Heavy responsibility lies upon the ship's officers in the proper maintenance and use of hatch boards and chain guards, for negligence in their placement has caused many a serious and fatal accident.

● Hatchway Ladders

Since time immemorial access to cargo spaces has been by means of hatchway ladders, and despite the obvious hazards it represents we find them in general use. These ladders are frequently difficult to negotiate because of offsets at the coamings, and being exposed are generally distorted or damaged by cargo, thus magnifying their dangers. Access to cargo spaces should be gained by means of well protected manholes and ladders, offset at each deck level. They should be arranged to permit one to face the hatch, if it be nearby, and designed to prevent fouling of ladder or rungs by stowed or shifted cargo.

When access is gained through bulkhead doors, the sills should be as low as is consistent with regulations or local conditions, and ample head room should be provided. Doors not having high coamings should have permanently built non-slip ramps.

● Cargo Gear

Of all hazards found on deck, we find cargo gear the most serious and most difficult of solution. It has been subject to the "rule of thumb" more than any other equipment aboard ship. The original layout for cargo gear should be the result of extensive and accurate calculations and observations. Overloading, and poor control of hoisting machinery, subjects cargo gear to excessive and incalculable stresses, and it behooves the designer to employ generous factors of safety in his calculations. Precedent should have little influence upon design.

Since the invention of methods of producing tubular steel booms, there has been little justification for the existence of the wooden boom. The strength of wooden booms can be approximated when new, but when age, weather, and stresses have had their play, their strength becomes an unknown factor. The success of the wooden boom has been largely due to a great but unknown factor of safety which experience has dictated. Steel booms have known and calculable strengths, and their failure through stressing is slow enough to permit all hands to clear.

Cargo boom fittings should be forged from an approved alloy steel, and subjected to severe tests for flaws. Links, padeyes and similar rigging fittings should be oversized to permit a safe reduction of section due to wear.

Standing rigging wire should be carefully selected with respect to strength and flexibility. It should be expertly spliced in lieu of the use of seizing or clamps. All thimbles and fittings should have proper radii to prevent stressing. While not pleasing to the eye, we can look forward to the general acceptance of a self-supporting type of structure which will practically eliminate the use of standing rigging.

Cargo falls should be rove through blocks whose sheaves are of ample diameter to prevent fatigue of strands, and patent heel blocks which do not whip in service should always be used. Cargo falls should be protected from the edge of hatch coamings by hatch rollers, which equipment should be so designed that falls or cargo cannot be fouled, endangering those working below.

Cleats, pads, bitts and other deck fittings should be placed where they give the best and safest results in working cargo, but when practicable they should be kept clear of walk ways and mounted on bulkheads or bulwarks. When mounted on deck they should be painted white to make them more visible in the darkness.

Cargo hoists are subject to considerable refinement, and where possible they should be electrically driven. The electric controls should have sufficient number of stops to simulate the desirable characteristics of the steam hoist. Steam hoists should have reciprocating parts under guards and, like the electric unit, the gears should be enclosed. Lubrication should be possible without attendant hazard. The controls should be so located that a single operator should have absolute control over the movement of the cargo hook, and the load should be within his sight as much as is practical.

● Living Quarters

The hazards to which crew and passengers are exposed are by no means confined to weather decks, the living quarters contributing heavily to the accident records. Fortunately they yield more easily to solution than do those outside. The most common accidents are slipping or tripping, with consequent falling. This type of accident seriously involves the passengers, many of whom are not familiar with peculiarities of ship construction or with the action of a vessel in a sea way.

The entrance doorways from weather decks are responsible for many accidents. Their sill heights are usually high, to meet regulatory or practical requirements, and to one not familiar with such construction it represents a tripping and falling hazard. Inside entrances to staterooms or public rooms should have little or no threshold. It is not uncommon to find high sills in these doorways, their existence being due more to tradition than to necessity.

For convenience in housekeeping a small raised sill is desirable at the door of a bathroom or toilet. A curb is a necessary part of a shower bath compartment; such a curb or coaming must not present a sharp edge, but may be topped with slotted pipe, a flange or with tiling. All door treads should be of distinctive color for the sake of visibility and, of course, adequately illuminated.

Not unlike the high door sill, the coaming usually found at the top of weather deck ladders or stairs represents the same dangers. These can usually be cut flush to the deck level by compensating for strength under deck. When such a procedure is not possible a low pitch non-slip ramp should provide equivalent safety.

The ever present slipping hazard is one that reflects upon the character of deck coverings, as far as construction is concerned. No passenger and, where avoidable, no crew member should have need to traverse a bare deck plate. Such a surface becomes polished and slippery when worn or wet, and becomes particularly dangerous to the wearer of

rubber heeled shoes. Weather doors should have non-slip treads or deck coverings on either side. Ladder treads should be similarly equipped.

Deck coverings of rubber or linoleum are very desirable for decorative features, and the designer must depend upon the operator to provide reasonable safety in preventing excessive coatings of wax polish.

Ceramic unglazed tiling for baths, washrooms, etc., provides a safe deck covering, which can be improved upon only through the addition of abrasives to their composition. Galley and pantry deck coverings are subject to an accumulation of cooking fats and other materials, which add dangers to the other natural hazards of such a place. Tiling with small and sharp grooves is satisfactory from a safety point of view, but difficult to keep clean. Terrazzo decking with a liberal content of abrasive or scoria presents the best compromise between safety and sanitation, but it does take heavy toll of kettle bottoms—a lesser evil.

● Maintenance Hazards

Maintenance of a vessel is a continuous and ofttimes a hazardous procedure, particularly the work that must be done overside or from elevated positions. Safe means for reaching such places should be provided when the ship is built. Steel mast ladders should displace the shroud ratlines, which are notoriously neglected. Inside ladders and walkways should provide safe access to stack tops, and clips, sockets, and grab rails should be installed in way of bridge fronts, superstructure, light and air trunks, to which the maintenance man can secure his staging, bosn's chair or safety belt.

● Machinery Spaces

The doors, ladders and gratings which provide access to machinery spaces represent the same type of hazards as similar equipment elsewhere aboard ship, and they yield to the same solutions in providing safety. However, the dangers are magnified, due to the proximity of moving machinery and to the presence of lubricating oil, which makes surfaces slippery.

Ready and safe access should be provided to all parts of the machinery spaces, including the different working levels about the main and auxiliary machinery, to various control valves and equipment, to boiler drums, stop valves and gage glass fittings.

Floor plates in machinery spaces should have a non-slip surface even when coated with oil. This is difficult of solution, although recent attempts have been made to improve upon the diamond plate, which has been a notable failure in providing safe walking surfaces. Floor plates should be well secured and supported, and if conditions make necessary that sections be portable, they should not be too large in section. However, the concealed piping systems should be equipped with accessible valves or stems, which would make frequent plate removals unnecessary. Guards should be provided for such openings and they should be well lighted. Shaft alley walkways should be of steel with flanged edges, and hand rails and shaft coupling guards should be installed.

Like the mainshaft couplings, all moving machinery should have guards which will prevent one from being struck by or thrown into machinery, which is a very real hazard when the vessel is in a seaway. Such guards must be designed with the thought that they may be frequently removed and replaced to facilitate repairs.

Machinery spaces should not be crowded even though revenue space is sacrificed. Spacious engine rooms are invariably safe engine rooms, and loss of revenue is largely compensated in the reduced costs of making repairs in uncramped quarters. Fortunately, progression in machinery development has been in the direction of enclosed moving or revolving parts, and the engine rooms are rapidly becoming one of the safest places on shipboard.

But with this development higher pressures and temperatures have become commonplace, and with these we find great possibilities of serious accidents. Regulations point the way to safe design, but thoughtful details will make safe operations more

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Running Lights of Pacific Shipping

● **Industry Founder**

F. E. Booth, president of F. E. Booth Company, Inc. Founder of the sardine industry, he established first plant in Monterey, 1898. Products of his present-day plants, millions of tons annually, are shipped universally. Rugged, hale . . . he trails moose and caribou in Canadian wilds. His office walls are heavy with evidence of his marksmanship.

Petroleum ●

Ray C. Ingram, supervisor, marine fuel oil sales, Union Oil Company of Cal. In U. S. air service during World War. Began petroleum career in wildcat fields of Montana in 1919 . . . geological surveying, then production. Has since served 17 years in nearly all phases of oil industry . . . 5 years in sales. Aviation enthusiast.

● **Offshore Operator**

Erik Krag, vice president Interocean Steamship Corp., managing agents for several U. K. Range lines, including the ANGER type motorships. Born in Denmark, his Viking heritage has always confined his career to ships and shipping. To San Francisco in 1914 . . . aided in establishing Interocean in '30. Marin County resident, he motors across the G. G. Bridge daily. Casts a mean fly . . rides a mean horse!

Port Engineer ●

John Clerico, Port Engineer of McCormick Steamship Company. Joined the line in 1923, promoted to present berth two years later. Son of Kansas, he served machinist apprenticeship in Santa Fe shops, Topeka. Went to sea early . . . shoreside with NELSECO . . . with Morse yard at Brooklyn . . . back to the engine room and up the ladder! His golfing prowess noteworthy.

● **Steamship Network**

Drew Chidester, of General Steamship Corp., Ltd. Born in Memphis, when 9 years old moved his parents West. Horatio Alger career: from $15 per month office boy to executive vice president, managing 9 services—engaging 83 ships in world-wide services. His mentality alert. Remarkable asset, his smile.

Marine Insurance ●

Fred B. Galbraith, manager Pacific Department, Marine Office of America. For 10 years with Balfour, Guthrie . . . countless friends in the California, Sansome and Pine "insurance circle". Stages marine underwriters golf tournaments but prefers hunting . . rides like a Piute. Two children welcome him nightly.

Propeller Club of California Holds Fall Golf Tourney

S. A. (Sid) Livingston piloting the committee comprised by Julian Arntz, Edward Egbert, Arthur J. Donnelly, Russell Haviside, Vincent Moravito, and Vernon Showell, mustered a goodly company of "turf-tossers" for a highly enjoyable go at the Lake Merced Golf Course on Thursday, October 21.

Your scribe arrived in time for the banquet. Wandering through the locker-room aisles he found the air thick with alibis. Many of the old favorites had run out of the money. It was the wrong day for form-players. Disappointed contenders, however, cheered up brightly over the epicurean fare and it was a happy assembly that surrounded the banquet table.

Chairman Livingston presiding at the head of the horseshoe left a moment to locate one of the prize-winners. A handsome electric clock greeted his return . . . a gift from the boys in appreciation of his grand efforts in planning the affair.

President Edward Harrison Harms was next honored. His gift proffered as a wedding present was a beautiful piece of glassware . . . about the size of a ship's wheel and requiring special transportation homeward.

● Committee Busy.

Speaking of the committee, Art Donnelly was the only member to receive a prize. Art was low gross for the meet and has a handsome golf bag to prove it!

Vernon Showell was handicapper, bookkeeper and general right-hand man on details . . . and while he shot a good game he just missed out on the trophies—this time!

Russell Haviside says "No alibis—but the turf bothered me. I'm used to hard-surfaced courts."

Gene Essner was weighted down with honors—and steel clubs. His low net also brought him the custody of the Perpetual Trophy.

L. K. Wilson and Frank DeBenedetti also made good with low nets in their flights, bringing them prize-winning laurels.

That "golfing P. A." John Pruner added another trophy to his collection bringing the total to seventeen.

W. Edgar Martin, John Parker, and Lou Levin also were rewarded by Chairman Sid. Eddie modestly credited his glory to the steadying influence of his partner Jim Hines.

Guest prizes and gate presents went to a lucky group. The pay-off here was the drawing of a lucky number by Trev Smith . . . for a gate-prize, mind you!

Bryant O'Connor rounded up some real fine entertainment. It clicked!

Two score banqueteers arrived by Caravan about locker-room time. Among them: Captain Tom Hunter, Dr. Arthur O'Niell, "R. C. A." Lindh, and President Eddie, the latter delayed by a double McCormick sailing.

We were intrigued by the handsome perpetual trophy awarded to Gene Essner. Here are the previous winners:

Richard F. Mongee	1930
Russell T. Pratt	1931
E. B. Skinner	1932
Eugene Essner	1933
J. P. Healey	1934
George S. Lacy	1935
Leslie F. Moody	1936

and now, after four years, back home with Gene!

A grand success, this 1937 Fall Tournament, and our congratulations to Chairman Livingston and his capable mates.

● Secretary In Sick Bay.

Stanley E. Allen is fast recuperating. We just heard the good news at the Navy Day luncheon. Our secretary has been in the sick bay for a week or so wrestling with that "ol debbil Flu". He has most certainly been missed and all hands will be glad to see him back on the quarter deck.

L. H. Edelman, Supervisor of Marine Sales, Associated Oil Company, member of Board of Governors, Propeller Club of California, is Commander U. S. Naval Reserve . . . actively interested in Sea Scout and Schoolship welfare.

● October 12 Luncheon Meeting

Frank W. Fuller, Jr., director of W. P. Fuller & Co. delighted a big audience with an account of his recent flying records. Speed! 2 hours and 17 minutes from here to Salt Lake. In Kansas City two hours later!! All the way across to the Bendix field in New Jersey in 9 hours!!! And flying at 16,000 feet. It was a great experience which Airman Fuller shared with his listeners. Chairman of the day was Robert E. Christy, vice president and manager of United Engineering Company.

● October 27 Luncheon Meeting

Members of the Propeller Club of California joined with the Navy League of the United States to commemorate Navy Day on this occasion.

In attendance were highest officials of the United States Navy and members of the C. C. Thomas Navy Post, American Legion, Naval Reserve officers Association, Veterans of Foreign Wars and other interested groups.

Guest of honor was Hon. Curtis Wilbur, former Secretary of the Navy.

Chairman of the Day Walter J. Walsh introduced distinguished visitors and presented guest speaker Hon. Frank R. Devlin who spoke on the importance of naval and merchant marine preparedness.

Steamship Dinner for S. F. is Announced

Announcement has been made of the Twelfth Annual Steamship Dinner! General Chairman is C. H. Chandler. Secretary of the voyage is Edward H. Harms. Steamship and allied industries will splice the main brace at 7:00 o'clock on Saturday, November 6, at the Gold Ballroom, Palace Hotel, in San Francisco. This is the time-honored event which inspires maritimers of the entire Pacific Range to chart their courses for the Golden Gate. Those who have come aboard the gay "S. S. Dinner" on previous voyages know that this 12th sailing will be momentous!

The Committees:

Dinner — Ralph W. Myers, Chairman, Shipowners Association; Donald Watson, Vice-Chairman, Pacific Coast Direct Line; W. E. Dooling, American-Hawaiian Steamship Company; A. J. Pessel, Matson Navigation Company; L. P. Bailey, Balfour Guthrie Company; Captain Walter Gay, Bank Line; Lloyd Swayne, Swayne & Hoyt; Cyril Meek, Bay Cities Transportation Company; A. K. Hulme, General Steamship Corporation; J. J. Coney, Hillcone Steamship Company; Dearborn Clark, American-Hawaiian Steamship Company; F. H. Fox, General Engineering & Drydock Company.

Finance—K. C. Tripp, Chairman, North German Lloyd; Philip Brown, Vice-Chairman, Bank Line; C. J. Euson, Luckenbach Steamship Company; L. C. Stewart, Sudden & Christenson; F. L. Doelker, Grace Line; J. C. Van Meurs, Blue Star Line; J. J. Walsh, Furness Line; H. H. Pierson, Williams Dimond Company; E. F. R. DeLanoy, Holland American Line; Ralph Sullivan, Norton Lilly & Company; Jas. Tyson, Jr., Nelson Steamship Company; W. J. Edwards, Jr., Olson Line.

Membership—W. C. Empey, Chairman, The Guide; Geo. A. Armes, Vice-Chairman, General Engineering & Drydock Company; Fred Ducato, Grace Line; Geo. J. Yater, Pacific Coast European Conference; P. M. Holway, Holway Steamship Company; M. F. Cropley, Matson Navigation Company; W. E. Usher, Calmar Line; A. S. Gunn, Bethlehem Shipbuilding Corporation; Charles L. Wheeler, McCormick Steamship Company; H. H. Brann, Haviside Company; Chr. Jensen, East Asiatic Company; Gilbert Macqueron, French Line.

Entertainment — R. S. Norton, Chairman, Sudden & Christenson; Ray Ingram, Vice-Chairman, Union Oil Company; H. E. Hornung, N. Y. K. Line; T. E. Cuffe, Dollar Steamship Line; L. B. Johnstone, Richfield Oil Company; K. M. Rutger, Mississippi Valley Barge Line; Ray Windquist, General Steamship Corporation; R. F. Burley, McCormick Steamship Company; F. W. Kutter, •Fred Olsen Line; W. R. Chamberlin, W. R. Chamberlin Company; Chr. Blom, Klaveness Line; R. A. McLaren, Williams Dimond Company; Armand de Pichon, French Line.

Reception—Philip A. Coxon, Chairman, Moore Drydock Company; John E. Cushing, Vice-Chairman, American-Hawaiian Steamship Company; Jos. A. Lunny, McCormick Steamship Company; George K. Nichols, Matson Navigation Company; T. A. Ensor, Kerr Steamship Company; Franz Schulze, Hamburg American Line; A. B. Johnson, Jr., A. B. Johnson Company; Erik Krag, Interocean Steamship Corporation; Norvin Fay, The River Lines; Cornelius Winkler, Transpacific Transportation Company; J. A. McEachern, Standard Oil Company; R. C. Robinson, Hammond Shipping Company.

Publicity—Gene Hoffman, Chairman, Dollar Steamship Company; Jerry Scanlon, Vice-Chairman, Grace Line; Leonard Lucas, N. Y. K Line; R. Robb, General Steamship Corporation; Lewis Lapham, American-Hawaiian Steamship Company.

Honorary Operating Committee—Past General Chairmen: W. J. Edwards, Norton Lilly & Company; Harry Scott, General Steamship Corporation; John C. Rohlfs, Standard Oil Company; Hugh Gallagher, Matson Navigation Company; Thomas Crowley, Shipowners & Merchants Tugboat Company; Harry Evans, E. C. Evans & Sons; M. J. Buckley, Dollar Steamship Company; R. W. Bybee, McCormick Steamship Company; Roger Lapham, American-Hawaiian Steamship Company.

Welcome to Sansome Street

It is with extreme pleasure that we learn that the offices of the Pacific American Steamship Association will be located in the Federal Reserve Bank building on the corner of Sacramento and Sansome Streets in San Francisco.

Pacific Marine Review headquarters are right down at the next corner so we extend a neighborly welcome to the P. A. S. A. and their affiliated groups . . . the Accident Prevention Bureau, the Pacific American Shipowners Association, the Waterfront Employers Association of the Pacific Coast, and the Waterfront Employers Association of San Francisco.

Eugene V. Winter Home

Eugene V. Winter, president of Eugene V. Winter Co., marine equipment manufacturers representative of San Francisco, has just returned to his home port following a visit to the Atlantic seaboard. While East Mr. Winter visited Auburn, New York; Boston, New York City, Baltimore and Washington. He reports that he found widespread activity in marine lines, particularly in the fields of diesel engine sales and pumping equipment. He learned that numerous plants are working two shifts, and in some instances three shifts. On every hand he noted attention centered on the program for modernization of America's merchant fleet through a vast shipbuilding schedule.

Names and News

EDWIN A. GARDNER

On October 4 Harry S. Scott, president of the General Steamship Corporation, Ltd., announced the appointment of Edwin A. Gardner as general passenger agent of the company, which took effect immediately.

Gardner, who brings to General Steamship much experience in the industry, is furthering expansion of the passenger and travel activities of the company. He was formerly general passenger agent for States Steamship Company at Portland, in which post he was successful in building up the passenger traffic volume to the Orient by way of San Francisco and Portland, resulting in the trans-pacific ships of the company becoming well known all over the country. Before his connection with States Line, Gardner was district passenger agent of the Dollar Line in San Francisco, and was in charge of travel for the American Express Company in Seattle and Portland, conducting a number of round the world tours and cruises.

Stanley Page continues as manager of the passenger department, with headquarters in San Francisco.

R. H. K. SMITH

A bon voyage testimonial dinner was recently tendered R. H. K. Smith, research efficiency expert for American-Hawaiian Steamship Company, by his fellow workers just before he sailed for Sydney. Smith has been with the company for almost thirty years, and was the brother of Sir Charles Kingsford Smith, the late distinguished flyer. He will be gone for some three months on the visit to his home, where he is going to see his mother after an absence of thirty-three years.

CAPTAIN CHARLES GREEN

At Snug Harbor, Staten Island, New York, where he had been residing for the past seven years, Captain Charles Green passed away the early part of October at an advanced age. He was well known on the Pacific Coast in former years, especially as master of the old Pacific Coast Steamship Company's ship State of California, and was in command of various Shipping Board freighters out of this port before his retirement.

Announcement is made of the appointment of Russell W. Michael as manager of the Southern Department of Fireman's Fund Insurance Company and affiliated insurance companies. The post was left vacant with the death of manager Charles A. Bickerstaff on July 4 last.

A native of Monroe, Georgia, Michael joined Fireman's Fund in 1911 as bookkeeper, when the company's southern headquarters were in Macon, Georgia.

Following the transfer of the department to Atlanta in 1914, young Michael was so ambitious to get into the underwriting end of the business that he proposed to take a reduction in salary. His career since then has been notable.

After filling various responsible positions in the office he traveled as special agent in Georgia, Florida and Louisiana, and in 1926 returned to headquarters to become agency superintendent and was appointed assistant manager in April, 1929.

Michael has served several terms as president of the Insurance Library Association of Atlanta, and in February, 1936, was admitted to the bar of the Georgia Supreme Court.

The Mechanical Goods Division of United States Rubber Products, Inc., has announced that **Frederick D. Benz**, formerly Manager, Wire Sales, Chicago Branch, United States Rubber Products, Inc., has been appointed District Manager of Wire Sales, Pacific Division, for the same company, with headquarters at San Francisco. This Division comprises the Los Angeles, San Francisco, Portland, Seattle, Spokane and Salt Lake City territories.

ROBERT W. GARROW

On September 7 Robert W. Garrow, district manager of Luckenbach Line at Philadelphia, died at the age of 46, leaving a widow and one daughter. He was formerly assistant freight traffic manager in the company's New York office, and had been head of the Philadelphia office since 1926.

CARRIER TO SYRACUSE.

George E. Swett of the firm bearing his name tells us of the removal of the marine sales—service—engineering offices of his manufacturing principal, Carrier Corporation, from Newark, N. J., to 405 Lexington Avenue in New York.

The Carrier business, both in the United States and throughout the world, has been expanding very rapidly. For some time now, each of their five factories (and the sixth one leased last year) has been operating with extra shifts. Each of the factories is crowded to capacity, and despite this fact, they are unable to produce sufficient of certain items to meet their needs.

After due deliberation of various means of increasing their facilities, it was finally decided to consolidate all of the manufacturing and general office facilities at Syracuse, New York. This move will give the company manufacturing space two to three times the former space.

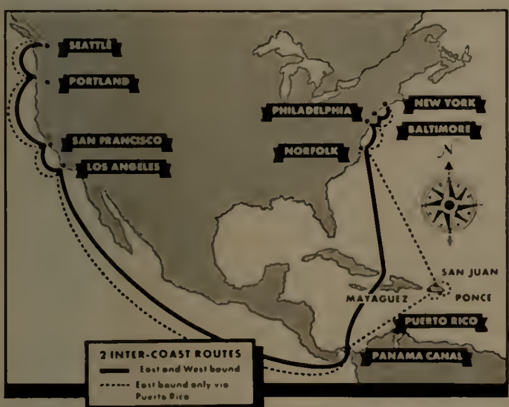
THOMAS N. ALEXANDER

After being ill for a short time, Thomas N. Alexander, claims agent at San Francisco for the Dollar Steamship Company, died at his home in that city on September 19. He was born in San Jose some 60 years ago, and in the late 90's joined the old Pacific Mail Steamship Company as purser on the Barracuda. In 1906 he became freight claim agent for that company, as well as for two others. Alexander later was associated with the Toyo Kisen Kaisha as claims agent, in 1916 becoming general passenger agent at Shanghai. He went with Dollar as claims agent in 1925, which connection he held until the time of his passing.

Trade Literature

"Johns-Manville Insulation", a new 32-page catalog, contains specific information on all of the sheet, block and pipe insulations which Johns-Manville has developed for service on various types of heated and refrigerated equipment in industry.

Of special interest to industry are ten pages devoted to specific recommendations for the insulation of many types of industrial equipment.



Vagabond voyaging on a freighter is now accepted as the latest travel vogue. From Coast to Coast you may have first-class accommodations in outside staterooms, all located amidships on the upper deck.

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Your Problems Answered by the Chief

(Continued from Page 39)

weight oscillating, and the spring effect which returns the system to normal when displaced. By adjusting the strength of the springs D and the position or amount of the weights G the critical rate of oscillation can be adjusted to a relatively low speed of rotation, so that an 1800 r.p.m. or higher speed rotor need be revolved no faster than 150 to 300 r.p.m. to be in its critical speed.

This process of adjusting springs and weights is called tuning. It would be dangerous to spin large rotors too fast, and turbine rotors would take a tremendous horsepower on account of air friction on the blades at high speeds.

When tuned and at critical speed the shaft oscillates in a horizontal direction as indicated by the arrows. Its movement is smooth and easy like a pendulum.

A dial indicator is placed to measure the vertical movement of the beam F, and when it reads a maximum, decreasing with increase or decrease of speed, the rotor is running at its critical speed. Trial weights are clamped to it and observations made as to their effect.

Figure 2 shows a machine set up to balance a turbine rotor. Smaller machines are available for smaller rotors.

On very large rotors the balancing machines can be set up on the frame of the turbine, and in some cases this has been done aboard a floating ship.

QUESTION

Can dynamic balancing be accomplished without removing the rotor from its own bearings?

ANSWER

This has been done. Obviously a cut and try running balance made in the machine's own bearings, if successful, is a dynamic balance. However, much time and effort are required, often with only partial success.

A set of instruments has been developed which electrically indicate the magnitude and angle of vibration on the bearings of a machine. Then by vector analysis the amount and location of correcting weights can be determined. Further details of this system will be mailed on request.

Our next article will discuss some general considerations of propellers.

Building the Golden Gate Bridge

A new motion picture, entitled "Building the Golden Gate Bridge," completed by Bethlehem Steel Company, was released October 10. It is a talking picture with a descriptive lecture on the sound track.

The picture gives a complete story of the construction of the bridge across the Golden Gate at San Francisco, beginning with the arrival of the steel on the bridge site. The succeeding scenes follow the erection schedule faithfully.

The huge steel towers, 746 feet high, that support the cables are seen to rise from their foundations as the steel is assembled and placed in position. The construction of the superstructure for the roadway on the 4200 foot suspended span is depicted in detail. Of particular interest are the many special methods required in handling the steel due to the great size of the structure.

Many difficult problems in the construction of the Golden Gate Bridge had to be solved, and the methods used are discussed in the descriptive lecture on the sound track of the picture. While it is a construction picture and possibly of greatest interest to groups of engineers and others connected with the construction industry, there is sufficient dramatic appeal in many of the scenes to make it unusually attractive to the layman as well.

The new picture is an interesting addition to Bethlehem Steel Company's library, which includes 16 m.m. talking pictures on such subjects as: The Making of Alloy Steel; Wire; Galvanized Steel Sheets; and The Manufacture of Structural Steel Shapes.

DR. EDWARD H. LINNEHAN

With the announcement of the appointment of Dr. Edward H. Linnehan to the newly-created post of medical director of the United States Lines, the shipping company revealed comprehensive plans for the expansion and development of its port medical facilities for the care of employees afloat and ashore and the unification of its thirteen existing shipboard hospital units under one responsible medical head.

As director of the new medical department that has been established, Dr. Linnehan will be responsible for the selection of all medical personnel, including surgeons, nurses, hospital attendants, pharmacists and hospital stewards employed in the company's transatlantic and intercoastal services, and will supervise the purchase of all medical supplies for the company.

He will also be in charge of a completely equipped medical unit now being installed on Pier 60, N. R., that will include an office, consulting room, examining room and an X-ray room in charge of an expert technician. This unit is designed to provide for examination, diagnosis and treatment of all employees of the company who come under the New York State Workmen's Compensation laws, as well as employees on ships in port.

WILLIAM MAINLAND

The directors of J. J. Moore & Company, Inc., recently announced that William Mainland has been elected president of the company, succeeding John B. Blair after the sudden death of the latter.

Mainland has been with the company since 1898, for the last thirty-three years having been secretary. He is widely known in shipping circles, and will carry on with the established policies of his company.

Blair passed away in San Francisco on October 14. He was the keystone figure in the famous old firm, with which he became associated in 1892. Some years after going with the company, he was operating on his own as a chartering and ship broker, later resuming his connection with the Moore firm, where he remained until his passing. He was 60 years of age.

Building Safety in Ships

(Continued from Page 56)

easily attained. The provision of locking devices for boiler and other stop valves, the proper labeling of all valves, the marking of pipe lines with distinctive colors, stencils or symbols, contribute greatly to safe procedure.

Care should be exercised in properly insulating hot pipes and surfaces, and pressure relieving devices are essential to safe operations. There should be provided also proper ventilation of spaces which might accumulate vapors or gases from fuel oil, lubricating oil, or that might become too heated for safe occupancy.

Refrigeration machinery spaces should have adequate safeguards against the dangers of leaking refrigerant. Where possible on freight ships, and always on passenger vessels, the refrigerant should be non-toxic. Ammonia as a refrigerant has very desirable characteristics, particularly in tropic waters, and when employed the refrigeration machinery rooms should be enclosed and separated from other spaces. It should be equipped with a sprinkling system which may be operated from without the space. Regulations and good judgment demand that gas masks be kept near at hand.

● **Electric Systems**

Electric generating and distributing systems, when installed according to the rules and regulations set up by the various agencies, represent small hazards, but when potentials of 230 volts or more are employed special care must be provided to insure the safety of operating personnel. Deadfront switchboard panels are desirable and there should be adequate space behind the board for repairs and trouble-shooting. The area back of the switchboard should be enclosed by mesh guards and provided with locks. When livefront switchboards are installed a guard rail should be placed to support the operator, and an insulated grating should cover the deck. Lights should be installed over the board which are supplied by current from an independent and emergency source.

Illumination of all parts of the ship should be in accordance with the accepted standards, and upon completion of the vessel, a thorough study should be made of the efficiency of the lighting arrangements, and the alterations and corrections for conditions which are not apparent on the plans, should be made. Adequate light is perhaps the greatest of safeguards.

Machine tools and other similar equipment throughout the ship should be driven by direct connected and independent electric motors. Drive belts have no place aboard ship.

Safety in machinery spaces is not possible without adequate and well located lifting gear. The store or tool room should have tackle and hoists capable of supporting the heavier pieces of equipment during repair, and proper connections to the ship's structure should be provided which will support and steady these pieces during repairs at sea as well as in port.

For purposes of regular maintenance duties, in the engine casings, ship's side or at boiler fronts, there should be installed pads, sockets and other facilities which will support stagings designed for the particular operations.

As numerous as are the ship's details, so are the number of points where safety rules can be applied to ship construction. It has not been the intention that this discussion should cover all items upon safe working conditions aboard ship, but it is the hope that the major sources of marine accidents have been bared, so that the findings may be applied at the time of building rather than as corrections after the ship has been placed in service.

Add to the ship which has had safety built into her structure a crew that is competent, alert and interested, and there is little that one could ask in the development of a merchant marine worthy of national pride.

According to maritime statistics travel by water is the safest form of transportation, notwithstanding the hysteria that has been carefully built up about certain misfortunes, and it is the hope and wish of us all that this good record shall not only be maintained, but that we shall see rapid improvement with the passing of our old and obsolete vessels and the building of our new merchant marine fleet.

Trade Literature

Liquid and Vacuum Pumps, Bulletin 15 of the Kinney Manufacturing Company, describes and illustrates: Rotating Plunger Pumps types S. D. and H. P.; three models of Heliquad Pumps; the High Vacuum Pumps; and several types of strainers and clutches. The Kinney engineering service for pump users is fully explained.

Built-together pump, Bulletin 5592, published by Fairbanks, Morse & Co., describes a two stage pump and motor built together and designed to operate against heads up to 500 ft.—higher than could be handled by a single-stage unit. In many applications it offers a less expensive alternative for multi-stage and split-case pumps, and its compactness and sturdiness qualify it for portable and semi-portable as well as stationary service.

The new F-M pump is well adapted for all classes of general pumping service with liquids low in viscosity and free from excessive foreign matter. Because of its compact design the pump is especially advantageous where space is limited. No special foundation is required; the pump is complete in itself and can be mounted in any convenient horizontal, vertical or angular position. Installation is extremely simple.

This new built-together pump, entirely designed and built in one factory, consists essentially of a two-stage centrifugal pump, with enclosed bronze impellers, mounted directly on the shaft of an F-M splash-proof motor.

Famous Shipyard Builds Notable Shop

(Continued from Page 37)

the shop, including an automatic, oxy-acetylene flame, profile cutting machine and adequate pressing equipment.

All of the tools in the above lists were purchased through the northern California agents, the Chas. F. Bulotti Company of San Francisco.

In the design and installation of the electric wiring in this shop considerable thought and attention were given to possible demands for welding. Thirty-six power outlets were provided for this purpose, each being of sufficient capacity to take care of alternating or direct current machines either for automatic or for manual welding operations. From these outlets electric welding of any type or nature can be operated at any point in the shop and for a considerable distance on any side thereof.

The area under the lean-to roof on the north side of the main bay is used for tools for special work and is fitted with a one-man plate table, large bending slabs, and several presses.

On the south side, the lean-to houses the executive offices, the welding and cutting shop, the oxygen and acetylene supply station, the central electric distribution panels, the tool room, the store and rivet room, and the toilet, wash, and locker rooms.

This latter room is fitted with the finest plumbing obtainable. Two large Bradley fountain lavatories operated by foot treadle and kept scrupulously clean make washing a pleasure. All fittings are stainless steel or chromium plate. Each man has an individual locker. There is ample ventilation and ample illumination both natural and artificial.

(Gabriel Moulin Photo.)

Interior view main bay featuring roof structure, shop cranes, and the Thomas gate shear, which has a capacity to trim 1-inch plates six feet wide.

A second story on the south side over part of the lean-to houses the drafting room and the template shop.

The Structural Department at the Moore Dry Dock Company at the present time is employing 150 men, of whom 120 work in the day shift and 30 in the night shift. Orders ahead cover $750,000 of steel fabrication. An interesting job in process is a hull and ladder for a gold dredger for the Natomas Company. While this is not a marine job it is a job that will float, and so makes a link with the shipyard side. The dredge hull will be fabricated and assembled in the plant, then disassembled into parts possible of rail shipment and shipped to its work location near Folsom, California. The overall dimensions of this hull are: length 163 feet, beam 58 feet, depth 11 feet 8 inches, and 11 cubic feet bucket capacity.

The new shop has been in operation at this writing about six weeks and is already justifying its cost. The Thomas automatic and semi-automatic spacing table punches are showing great savings over the old hand fed type. On duplication work these machines turn out in a day from six to ten times the number of holes that would be possible on a hand fed press, and the holes are more accurately spaced. In addition they save the work of the man or men who lay out the work.

Ranking executives of the Moore Dry Dock Company are:

Mr. Jos. A. Moore, President,

Mr. Jos A. Moore, Jr., Vice President,

Mr. Nat Levy, Secretary.

Again we congratulate the Moore Dry Dock Company on its progressive policies and shrewd foresight, as evidenced in this splendid addition to its facilities for fabricating steel.

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SMOLENSKY NOISELESS CHECK VALVES
BACHARACH INDUSTRIAL INSTRUMENT COMPANY

CO_2 EQUIPMENT
MAIHAK ENGINE INDICATORS
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For the Deck Officers

(Continued from Page 41)

trade went back to a gradual increase in size as engines and other equipment kept pace. By 1870 the length had increased to 400 feet and the tonnage to about 4,000 gross. These vessels were all equipped with one propeller. In 1880 the length had increased to over 500 feet and the tonnages were over 7,000 tons, and the next ten years saw no increase in length but the tonnage had increased by approximately 2,000 tons per transatlantic ship. 1900 saw vessels of the size of the Great Eastern, or 680 feet, but with improved engines and construction these were very successful. About this time was the end of sails on steamers; engines were a proved fact and sails were superfluous, and from this time on steam vessels took on a trimmer look and were built in larger dimensions. In 1905 the first transatlantic vessel was fitted with turbine engines.

We now move to the present day, with high pressure turbines, improved diesel engines, hulls that reduce resistance, streamlined rudders, fathometers, radio direction finders, metal mikes and Gyro Compasses—a day we all know about—but to bring us to a realization of the things that have taken place in the 125 years before our time, we have gone over a few details of the steamer as it was to our ancestors. They tried and made a success of it, and there is no reason why we of the shipping business and those who have pride in our merchant marine cannot go forward with as great strides as those before us.

A Solution for Scale Problems

Every engineer knows that the formation of scale or other foreign deposit in steam boilers, diesel engines, condensers, evaporators, coils and other engineering plants immediately causes impairment of mechanical energy and inevitably results in operating difficulties and in costly losses on account of excessive fuel consumption, plant shut-downs, renewals and repairs.

Tremendous progress has been made recently by scientific research in this matter. Startling gains in economy and efficiency are derived from the application of the scientific principles resulting from this research. Whereas a short while ago the operation of removing scale from a certain engineering plant often took weeks to accomplish, and involved heavy dismantling, shutdown and other costs, it can now be thoroughly done within a few hours by these newest processes at extremely low cost, without any injurious after effects and, in most cases, without even the necessity of dismantling.

When it is realized that the wastage in fuel alone is 60 per cent in the case of boiler scale ¼ inch thick, and more than twice that percentage for heavier scale, it is obvious that the adoption of scientific de-scaling processes will result in saving very large sums in engineering plant operation and maintenance.

These processes operate on certain colloidal principles that are everywhere demonstrating their superiority over chemical theories of scale removal and prevention.

The manufactured engineering products covering the application of these new colloidal processes have come to be known as the engineering SuperSols. Among the most outstanding are those named ScaleSol, DieselSol, BoilerSol and CarbonSol.

The first mentioned is a handy solution for rapidly dissolving scale from condensers, evaporators, coils, and pipe systems.

DieselSol will completely descale the complicated water cooling passages of diesel engines of naval vessels, submarines, motorships, tugs, yachts and fishing craft in a few hours, without dismantling. Over four hundred land and marine diesels have already been successfully de-scaled by the use of this product.

BoilerSol is being widely adopted for preventing boiler scale forming and for removing existing scale. It successfully prevents pitting and corrosion in all types of land and marine boilers. It is a scientifically perfect colloidal treatment, operating through the feed water, and it effectually nullifies all scale forming, pitting or corroding substances therein. Only a small amount is required to efficiently accomplish this work, and firms who have adopted the BoilerSol process are proving that their boilers are maintained in perfect condition at all times and at extremely low cost.

CarbonSol brings about the speedy dissolution of carbon deposits from affected parts.

The inventor of these new processes is Captain H. Gray Jarvis, late of the British Navy.

SuperSol Products Company, of Portland, Oregon, are the Pacific Coast manufacturers of these products.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912 AND MARCH 3, 1933 Of Pacific Marine Review, published monthly at San Francisco, California, for October 1, 1937.

State of California, County of San Francisco.

Before me Edith Goewey, Notary, in and for the State and county aforesaid, personally appeared Bernard N. DeRochie, who, having been duly sworn according to law, deposes and says that he is the Business Manager of Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are.

Publisher, Jas. S. Hines, 500 Sansome Street, San Francisco, California.

Editor, Alex J. Dickie, 1035 Mariposa Ave., Berkeley, Calif.

Managing Editor, None.

Business Manager, Bernard N. DeRochie, 500 Sansome St., San Francisco, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address as well as those of each individual member, must be given.) Jas. S. Hines, Owner.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Bernard N. DeRochie,
Business Mgr.

Sworn to and subscribed before me this 24th day of September, 1937.

Edith Goewey
Notary Public in and for the City and County of San Francisco, State of California
(My commission expires November 22, 1940)

Building in American Yards

(Continued from Page 53)

design of hull form and longitudinal hull framing. Estimated completion date October, 1938.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110' x 52' x 8'. Launching date September 21; **delivery date, approximately November 15, 1937.**

One steel vegetable oil barge for New York Tank Barge Co., N. Y.; 650 gross tons; capacity 1250 tons; 195' x 42' x 12'. **Estimated launching date November 1, 1937;** estimated delivery date December 1, 1937.

DRYDOCK AND ROUTINE REPAIRS: **Conversion of Amsco from general cargo carrier to oil tanker. Estimated delivery date November 30, 1937.**

JAKOBSON & PETERSON, INC.
Brooklyn, N.Y.

NEW CONSTRUCTION:

One all welded steel diesel bulk oil delivery launch for Socony-Vacuum Oil Co.; 55' x 13' 6" x 7' deep; 60 HP Model 36A Fairbanks-Morse engine, 3:1 reduction gear.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

Two all welded towboats for Pan American Petroleum & Transport Co., Texas City, Texas; 64'11", beam molded 18', depth molded 7'6"; equipped with 380 H.P. Atlas Imperial diesel engine. Delivery dates December 1, 1937, and January 1, 1938.

Six all welded oil barges; 173' x 39' x8'6"; for Pan American Petroleum & Transport Co., Texas City, Texas. **Delivery dates October, 1937,** to January 1, 1938.

MANITOWOC SHIP BUILDING CO.
Manitowoc, Wis.

NEW CONSTRUCTION: **One single screw, electrically welded, steel oil tank** steamer, 465'x55'x28', for Standard Oil Co. of Indiana, to be used on Great Lakes; triple expansion surface condensing engine of 2,500 h.p.; two Scotch boilers; carrying capacity, 2,-700,000 gallons of oil. **Launched, September, 1937; delivered October, 1937.**

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **One double ended steel diesel ferry boat,** 208' x 62' x 9', for the Claiborne-Annapolis Ferry Company; keel laid September 15, 1937; launching date December 15, 1937; delivery date May, 1938.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935. No. 412, launched May 8, 1937; No. 413 launched **October 2, 1937.**

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359** air craft carrier **CV5, Yorktown,** ror U. S. Navy; keel laid May 21, 1934; launched April 4, 1936; **delivered September 30, 1937.**

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying date December, 1937.

Hulls Nos. 365 and 366, two tugs for C. & O. Railway; LOA 109', beam 28', depth 14'6". Keels laid May 24, 1937; launched September 8, 1937.

Hull No. 367, diesel electric tank vessel for Standard Oil Co. of New Jersey; length 260'6"; beam 43'6"; depth 18'3". Keel laid September, 1937.

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L. O. A. 184', L.B.P. 163', beam molded 35', depth molded amidships at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launched June 22, 1937; **delivered, October, 1937.**

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively. Keel laid for first ship May 20, 1937.

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; keel laid March 22, 1937; **launching date, November 20, 1937;** delivery date, December 20, 1937.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, **launching date, October 2, 1937; delivered October 16, 1937.** No. 162, **launching date October 30, 1937; delivery date November 13, 1937.**

Hulls Nos. 164 and 165, two diesel tankers for The Texas Company; 465' x 65' x 34'6"; 12,000 dwt. No. 164, keel laid December 15, 1936; launched September 26, 1937; **delivered October 16, 1937.** No. 165, **launching date October 19, 1937; delivery date November 30, 1937.**

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. No. 166, launching date December 4, 1937; delivery date December 26, 1937. No. 167, launching date January 15, 1938; delivery date February 20, 1938.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T. Keel laid September 1, 1937; delivery date June 1, 1938.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; keel laying date October 11, 1937; delivery date, September, 1938.

Hull No. 170, one single screw steam tanker for Bernuth, Lembcke Co., Inc., New York; length 462'4"; beam molded 65' 0"; depth molded 35' 0", DWT approximately 12,900 tons. Keel laid September 20, 1937; delivery date June, 1938.

Hull No. 171, one single screw steam tanker for Tide Water Associated Oil Co.; 462' 4" x 65' x 35'; 12,900 dwt.; delivery date July 6, 1938.

UNITED SHIPYARDS, Inc.
Staten Island, N.Y.

NEW CONSTRUCTION:

DD385, U.S.S. Fanning, Destroyer for U.S. Navy; L.B.P. 334'0"; beam 35'0"; mean draft 10'10"; keel laid Apr. 10, 1935; launched September 18, 1936; **estimated delivery, October 8, 1937.**

Hulls Nos. 840, 841, and 842; three ferry boats for City of New York; 267' overall, 66' extreme breadth, 19'9" depth; keels laid April 4, April 27, and May 1, 1936, respectively. 840 and 841 launched May 7 and June 3, 1937; 842 launching date December 15, 1937; delivery dates December 8, 1937; January 5, 1938, and February 2, 1938, respectively.

Hulls Nos. 850, 851, and 852, three sludge vessels for City of New York, Department of Sanitation. Length on W L. 250'. Beam 43'6", Depth 16'. Keel laying dates, April 14, May 24, and July 22, 1937, respectively; **launching dates November 5, 1937,** December 6, 1937, and January 6, 1938, respectively; delivery dates, December 15, 1937, January 12, 1938, and February 9, 1938, respectively.

Hulls 853 and 854, two oil barges for Standard-Vacuum Oil Co., Inc. LOA 177', breadth 36', depth 13'6". Keels laid June 8 and July 22, 1937; **estimated launching dates October 8 and October 22, 1937; estimated delivery dates October 23 and November 6, 1937.**

Hull No. 856, fireboat for City of New York. Estimated keel laying date March 22, 1938; estimated launching date June 28, 1938; estimated delivery date August 20, 1938.

PACIFIC MARINE REVIEW

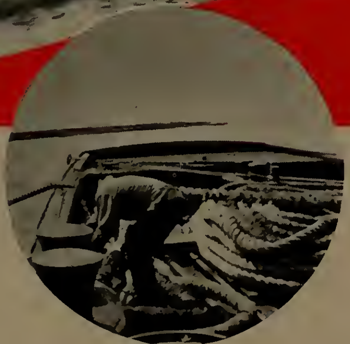
DECEMBER
1937

At San Francisco—
Launching of the U. S. Destroyer McCall,
at Bethlehem's Union Plant, Nov. 20, 1937

Official Organ
Pacific American Steamship Association
Shipowners Association of the Pacific Coast

The Cruise of the "Sunshine"

. . . an 1100 mile tow with SUPERCORE



(Right)—The stern of the "Sunshine" with a glimpse of one end of the 1050 foot log raft in the background.

(Photos courtesy of W. T. Cleverdon, Jr.)

3 CRUISEE 3300 MILES!

An 1100 mile open sea tow of a giant log raft 1050 feet in length, 28 foot draft, 65 foot beam! That—in a nutshell—is the record-breaking accomplishment of the tug "Sunshine" when she made this tow from the Columbia River to the harbor of San Diego.

But once was only a start! Twice—three times—this feat was accomplished, nearly 2,000,000 cubic feet of lumber being safely transported at each trip through 1100 miles of stormy open sea. A TOTAL TOW OF 3300 MILES!

No ordinary tow line could stand a strain as severe as this. It must be a line built to stand the hardest punishment, a line that would handle easily, a line that would stand the pull of a 1000 horsepower against a weight of millions of pounds.

For a job like this, Tubbs Supercore was the natural selection. No other rope has such strength. No other rope has such endurance. No other rope is so easy to handle. No other rope is made so that each fibre works as a unit, carrying its equal share of the load.

The same 12-inch circumference Supercore line that made the first tow, made the second and third without appreciable wear. Another testimony of its endurance in the Marine field of the Pacific.

Tubbs Cordage Company

200 Bush Street, San Francisco

Mills in San Francisco

PACIFIC MARINE REVIEW

DECEMBER 1937
VOL. XXXIV NO. 12

CONTENTS

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Raising the Commodore's Flag on Matson Liner Lurline

On November 12th the rank of Commodore of the Matson fleet was bestowed on Captain Charles A. Berndtson, master of the Lurline. Left to right above are: Commodore Charles A. Berndtson; William P. Roth, President of the Matson Navigation Company; Irwin Scott, General Superintendent; Hugh Gallagher, Operating Manager; Captain Andrew G. Townsend, assistant to the President (behind Mr. Gallagher); Captain James P. Rassmussen, Port Captain at Honolulu; George K. Nichols, Engineering and Maintenance Manager; O. O. Britton, Purser, Lurline; H. O. Matthiesen, Chief Officer, Lurline.

PACIFIC MARINE REVIEW

VOLUME XXXIV | DECEMBER 1937 | NUMBER 12

Season's Greetings to the Industry

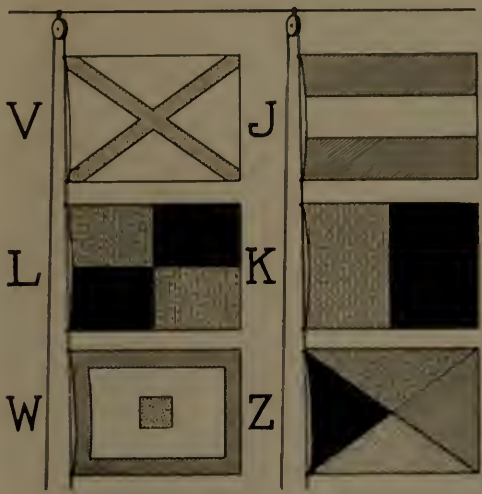
Last December, in raising this International Code Signal for "Season's Compliments," we expressed the hope that on or before Christmas American deep sea ships might be busy on their mission of carrying American trade and American good will to the ports of the seven seas. That hope was partly fulfilled with the settlement of the maritime strike. Our ships did go out on the ocean trade lanes before Christmas, and we were thankful that it was so.

Now once more we raise that signal which in December can mean nothing else but the good old fashioned greetings:

MERRY CHRISTMAS

HAPPY NEW YEAR

We do this fully conscious of the fact that Pacific-American shipping is now facing several crises, calling for very expert diagnosis and prompt, effective treatment.



VLW JKZ
SEASON'S COMPLIMENTS

However, Pacific Marine Review, in its thirty-three years of service to Pacific-American shipping and allied industries, has watched those industries weather many a crisis and come back stronger and more able to cope with their inherent handicaps.

As we look back over this third of a century we see a succession of peaks and valleys in the curve of progress. Perhaps the simplest and most graphic illustration of this curve would be the publication record of this journal.

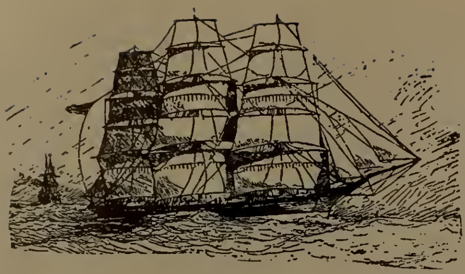
The present outlook, judged in the light of past experience, would indicate that the next third of this century will see an even larger growth.

And so, against whatever dark clouds may be hanging on the horizon, we fling our seasonal signal flags to the brave winds of the Pacific Ocean, confident that the future of Pacific-American shipping is in competent hands and will prosper in the building up of better trade relations and better understanding between the nations that girdle the world's greatest sea.

Sincere best wishes for a Merry Christmas and a Prosperous and Happy New Year to all Pacific-American ship operators, shipbuilders, ship supply agencies, and mariners, from the staff of Pacific Marine Review.

J. S. Hines, Publisher
A. J. Dickie, Editor

B. N. DeRochie, Assistant Publisher
Paul Faulkner, Advertising Manager



From *Navigation Acts*

The British Never Forget—We Do!

By Ernest E. Johnson

The Liverpool Journal of Commerce of July 20, 1937, contained the following article:

TO-DAY IN THE PAST

On July 20, 1789, the Congress of the United States passed the third of their famous Navigation Acts within three weeks. The first one provided for a heavy tariff on imports into the Republic, the second one levied a special duty on tea which was not imported directly from China in American ships, and the third one, the Act under notice, allowed still further discrimination. American-built ships owned by American citizens could enter American ports on payment of a tonnage duty of 6 cents per ton only, but American-built ships owned by foreigners, mostly Britons, who had taken their ships across the Atlantic when the United States became independent, had to pay 30 cents a ton, while ships which were built as well as owned by foreigners were mulcted of no less than 50 cents per ton. Naturally enough, this preference gave an immense advantage to the American shipyards.

But they pass up the reasons for these Acts. Here they are:

In the reign of Richard II, 1377-1399, the following law was enacted:

"Item, To increase the Navy of England, which is now greatly diminished: It is assented and accorded, That none of the King's liege People do from henceforth ship any Merchandise in going out or coming within the Realm of England (in any Port), but only in ships of the King's Liegance; and every Person of the said Liegance, which after the Feast of Easter next ensuing, at which Feast this Ordinance shall first begin to hold place, do ship and merchandise in any other Ships or Vessels upon the Sea, than of the said Liegance, shall forfeit to the King all his Merchandise shipped in other Vessels, wheresoever they be found hereafter, or the Value of the same; of which Forfeitures the King will and granteth, that he that duly espieth, and duly proveth that any Person hath any Thing forfeiteth against the Ordinance, shall have the Third Part for his Labour, of the King's Gift."

Henry VIII, 1509-1547, further confirmed these laws and enlarged upon them. The law had already established (1) The value of the merchant marine to the navy; (2) the value of the navy to the merchant marine; (3) development of the English mercantile marine by prohibiting measures to force shipment to English ships; (4) providing English seamen by decreeing majority must be English; (5) all goods from colonies to be shipped foreign to be brought to an English port for payment of customs dues and transhipment.

After mentioning that "Inasmuch as it is evidently and notoriously known that the greater part of this our Sovereign Lord the King's Realm of England . . . are compassed and environed by and with the great seas . . . And where the Navy or multitude of ships of this Realm in times past hath been and yet is very profitable, requisite, necessary and commodious . . . as well for offense as defense, and also the maintenance of many masters, mariners and seamen" and further recalling the Statutes passed "in the Fifth Year of the Reign of the Right Noble King Richard II" this proclamation is made:

"Therefore, the King's Majesty, having great zeal and tender respect unto the Commonwealth of this his Realm, willeth that it be enacted by the assent of the lords spiritual and temporal and the Commons in this present Parliament assembled . . . that the said statutes and all and everything in them contained shall stand and continue in their full strength, force and effect . . ."

Queen Elizabeth, 1558-1603, further strengthened these Acts by stronger preferential duties, creating larger ships for foreign trade, development of fisheries to English ships and fishermen, coastwise trade limited to English ships, prohibition of sale of English ships to foreigners, erection of beacons, marks, and signs for safe navigation, aid to disabled seamen, first real legislation covering marine insurance.

Then James I, 1603-1625, made the rule that forced the issue and eventually created the American Navigation Acts of 1789. Here it is:

"Moreover, our gracious will and pleasure is, and we do, by these presents, for us, our heirs, and successors, declare and set forth, That, if

to Reciprocity Treaties

any person or persons, which shall be of any of the said colonies and plantations, or any other, which shall traffic to the said colonies and plantations, or any of them, shall at any time or times hereafter, transport any wares, merchandises, or commodities, out of any of our dominions, with pretence to land, sell, or otherwise dispose of the same, within any the limits and precincts of any the said colonies and plantations, shall carry the same into any other foreign country, with a purpose there to sell or dispose of the same, without the license of us, our heirs, and successors, in that behalf first had and obtained; That then, all the goods and chattels of such person or persons, so offending and transporting, together with the said ship or vessel, wherein such transportation was made, shall be forfeited to us, our heirs, and successors."

Thus the right was held and maintained that goods to or from the colonies could only be shipped and received from foreign countries via a stipulated English port, where the goods had to be unladen and duties assessed both inward and outward, creating double duties for the benefit of the English rulers.

Again, in 1629, Charles I:

"We strictly command that the statutes of the fifth of King Richard II, the fourth of King Henry VII, and the thirty-second of King Henry VIII, made against the shipping of merchandise in strangers' bottoms, either inward or outward, be duly put in execution; and that neither the said company (Eastland), nor any other whatsoever, be permitted to import or export any of the above-named commodities in any but English bottoms, under the penalties in the said statutes contained."

During the Cromwellian era, 1642-1660, there were new developments:

"That no merchandise of any part of Europe could be imported into England, Ireland, or the English Colonies, save in vessels owned by the English OR BY PEOPLE OF THE COUNTRY WHERE THE GOODS WERE PRODUCED."

Meanwhile, the American Colonies, in defiance of the many decrees, were trading with the Dutch and other foreign nations without first sending the goods to an English STAPLE port for double duties and re-export, and English men-of-war were sent to enforce these Royal decrees.

Then came the reign of George III, 1760-1820, when more stringent measures were taken. No ships could clear for the Colonies unless the whole of the cargo was loaded in British Isle ports. Foreign ships found within two leagues of British American Colonies were subject to forfeiture and to cap it all came the famous Stamp Tax of 1765—taxation without representation — which culminated in the Boston Tea Party and severance of relations that followed.

The new confederation of the thirteen states still had to battle the British Navigation Acts and their prohibiting measures, which measures were more or less enforced from the late fourteenth century to 1850, about 450 years. The sea was the national highway for these early settlers. Each State passed its own Navigation Acts, as hurtful to the sister States as to the competition they were designed to meet. Hence, the first thought of the first Congress of the United States was to pass effective laws to protect American shipping. That they were effective, even though PERMISSIBLE instead of PROHIBITIVE, is testified to by the article quoted above.

But, the English kept their laws active and effective until they were supreme on the high seas. Not until the Acts were considered dangerous to further development were they abrogated.

America, however, abrogated her Acts in 1828, sporadically effective for only 40 years, when Congress passed the famous Reciprocity Act. From this period can be traced the steady decline and fall of the American merchant marine in the overseas trade.

New

Associated Oil Tanker

Sun Shipbuilding and Dry Dock Company Building 12,800 Ton Deadweight Capacity Tanker for Pacific Coast Service of Tide Water-Associated

Work is progressing at the Sun Yard on the new steam tanker for the Pacific Coast service of the Tide Water-Associated Oil Company, which is scheduled for delivery in July, 1938. Much of the steel work is in process of fabrication. The keel was laid during the first week in November and erection is proceeding on schedule:

The principal characteristics of this vessel are:

Length overall ....459 feet 6 inches
Length B.P. ....442 feet 0 inches
Beam molded ....65 feet 0 inches
Depth Molded Upper Deck ....
......................35 feet 0 inches
International Summer Draft to
bottom of keel....28 feet 6½ inches
Displacement at this draft ....
....17,225 tons
Deadweight capacity .....12,800 tons
Cargo capacity at 98° ....103,000 bbls.
Main bunker capacity........6200 bbls.
For'd deep tank bunker......4400 bbls.
Water tank capacity..............320 tons
Special tanks for lubricating
oils in bulk ....40,000 gallons

The ship is of single screw, single deck, longitudinal wing bulkheads type, with forecastle, poop and bridge erections connected by elevated walkway, with semi raked stem, and with cruiser stern. Careful attention to detail of form and line have resulted in a pleasing appearance of grace and liveliness in the profile of this ship. Progressive rake of masts and funnel heighten this effect—the foremast ⅜ inch to the foot, the mainmast ¾ inch to the foot, and the funnel ⅞ inch to the foot.

All design, construction and equipment of this hull are to be in accordance with or in excess of the highest requirements of the American Bureau of Shipping and in conformity to the rules of the Bureau of Marine Inspection and Navigation of the U. S. Department of Commerce. All shell and deck plating is riveted, but the majority of joints in the interior of hull and in the superstructures are welded.

● Arrangement of Hull Space

This hull will be divided into 16 thwartship compartments by 15 oil and watertight thwartship bulkheads. The cargo tank space is further subdivided by two longitudinal parallel bulkheads arranged port and starboard 14 feet 6 inches inboard of the ship's side amidships. Since there are eight thwartship cargo spaces this arrangement gives 24 cargo tanks separated by oil tight bulkheads.

From the stem aft the compartments are designated: Forepeak and stores; dry cargo hold and fuel or trimming tank; forward cofferdam; tanks numbers 1, 2, 3, 4, 5; wing cofferdams and pump room; tanks numbers 6, 7, 8, after cofferdam; fuel bunker; machinery space; and after peak tank.

The main cargo tanks all measure 34 feet in the length of the ship and 36 feet in the beam, with the exception of No. 6, in which the midship pump room is installed within those dimensions. The wing tanks are all 34 feet in the length. All stiffening members on the fore and aft bulkheads are on the wing tank side of those bulkheads.

All of the deck erections are of steel throughout. The forecastle houses, on the main deck, the carpenter shop, the lamp room, the paint and oil shop, and the bosun's stores; below the main deck, the forepeak tank, the dry cargo, the chain locker, a tank for fuel oil or for trimming ballast, and a pump room.

The bridge erection includes the navigating bridge, the upper bridge deck, and the bridge deck. On the navigating bridge are the wheel house and the chart house, with a small room off the latter for the new type Sperry Master Gyro Compass.

● Crew Accommodation.

Right across the forward end of the house, on the upper bridge deck, with natural light and air on three sides, is the captain's suite, including a spacious and elegantly furnished office, a very commodious stateroom, and a modern private bathroom. The after end of the house is occupied by the radio equipment and the radio operator's stateroom. Outside this house the deck forms open balconies port and starboard, connected by galleries forward and aft of the house, and giving ample quarterdeck space for constitutionals.

The bridge deck house is 16 feet larger in the beam than that on the upper bridge deck. It contains the hospital bay, six bedrooms, and four bathrooms. The first officer has a corner room with a private bath adjoining. On the port side are two spare rooms with communicating bath between. The second and third officer and the steward each has a nice room and a common bathroom.

Four berths are provided in the hospital bay, which has a fine bathroom adjoining. It will be noted that this is a higher percentage of baths per person than is installed in the majority of the first class passenger accommodations afloat today.

Going aft to the deck house on top of the poop we are impressed again with the planning for comfort and convenience in the arrangement of the various spaces. On the forward end of this deck is a nice promenade space around the engine hatch and skylight equipped for awnings port and starboard. The boiler hatch and the uptake of the stack are partly enclosed by the forward end of the house, which is entered by doors port and starboard of this hatch casing. These doors open on four foot passageways, which run straight through to the open deck aft of the house, forming a natural air duct for ventilation, and for insulating the living quarters port and starboard from the heat of the stack. A broad thwartship passageway connects these two fore and aft aisles just aft of the boiler hatch casing.

On the starboard side the chief engineer will have a fine suite, consisting of office, stateroom, and private bath. The first assistant engineer has a large stateroom with private bath on the port side. Second and third assistants and the machinist each has a room, and there is one spare room. These four rooms are served by a large lavatory equipped with showers, toilets, wash basins, etc. Thus for the five persons of the engine room staff there are three baths. Each bedroom is fitted with a desk, berth or berths, wash basin with hot and cold water, a spacious locker, and comfortable chairs and sofas.

Below the poop deck house space provides room for the galley, the bakery, the laundry and linen rooms, the officers' mess, the crew's mess, the crew's lounge, two bathrooms, and four bedrooms. The bedrooms are each for two persons, with the exception of the first cook's room, which is private.

Galley, bakery, and laundry are grouped centrally as a continuation of the boiler hatch casing, and are equipped with the most modern machinery, of adequate capacity to take care of the ship's requirements. A W. S. Ray oil burning range is used in the galley. A Frigidaire galley service refrigerator will be installed and a Frigidaire scuttle butt for cool drinking water.

Here, again, we find a wide passageway fore and aft dividing the living quarters port and starboard from this central casing. These passageways have doors at the forward end but are open at the stern end. In the officers' mess 14 sit down comfortably at table. In the crew's mess there are seatings for 22. The crew's lounge is approximately 14 x 18 feet, and is furnished with a reading table, two card tables, and comfortable lounging chairs.

On the upper deck under the poop there are five rooms on port side for firemen, oilers and wipers, and six rooms on starboard side for seamen. Two toilet and bathrooms are provided, one on each side of ship. Each room has a desk and chair, a bench, a wash basin with hot and cold water piped, two lockers, and two berths. Aft on this deck are the refrigerated stores and the steward's storeroom. Three insulated cold storage boxes will be installed, one for meats, with 775 cubic feet; one for vegetables, with 560 cubic feet; and a small utility box. These boxes will be served by two electric motor drive Carrier-Brunswick refrigerating units each of 2½ tons capacity.

Throughout these quarters the furniture is all of metal; all partitions other than steel bulkheads are metal faced paneling with fire resistant core. Four stairways provide easy connection between deck levels, and access to every division of the enclosed space is made easy and convenient.

In all of these quarters the steel plating of the ship is carefully insulated for comfort. Mechanical and natural ventilation is provided throughout. Steam heat is available in all rooms, and a built in radio installation makes broadcast programs available with a "plug in" receptacle in each room.

● Machinery Installation.

The propulsion power plant of this tanker will be composed of two Foster-Wheeler controlled superheater type steam generators supplying steam at 400 pound superheater outlet pressure 725° total temperature to a cross compound double reduction gear General Electric turbine producing 3600 shaft horsepower at 85 revolutions per minute of the propeller shaft. The propeller design calls for a solid bronze four bladed wheel capable of absorbing the power and converting it into a speed of 13 knots on trials with the ship at full load draft.

The boilers to be used are of the separately fired superheater type, so arranged that saturated steam can be taken off the drum, and steam with 20° superheat can be obtained from the superheater outlet with the superheater burners not working. No air preheater is used, but the air is led to the burners through a double casing round the sides and bottom of the steam generator, absorbing in its passage much of the heat that is radiated from the inner casing. The uptake space saved by this elimination of the air preheater is devoted to large banks of economizer tubes. Thus each boiler has the following heating surface:

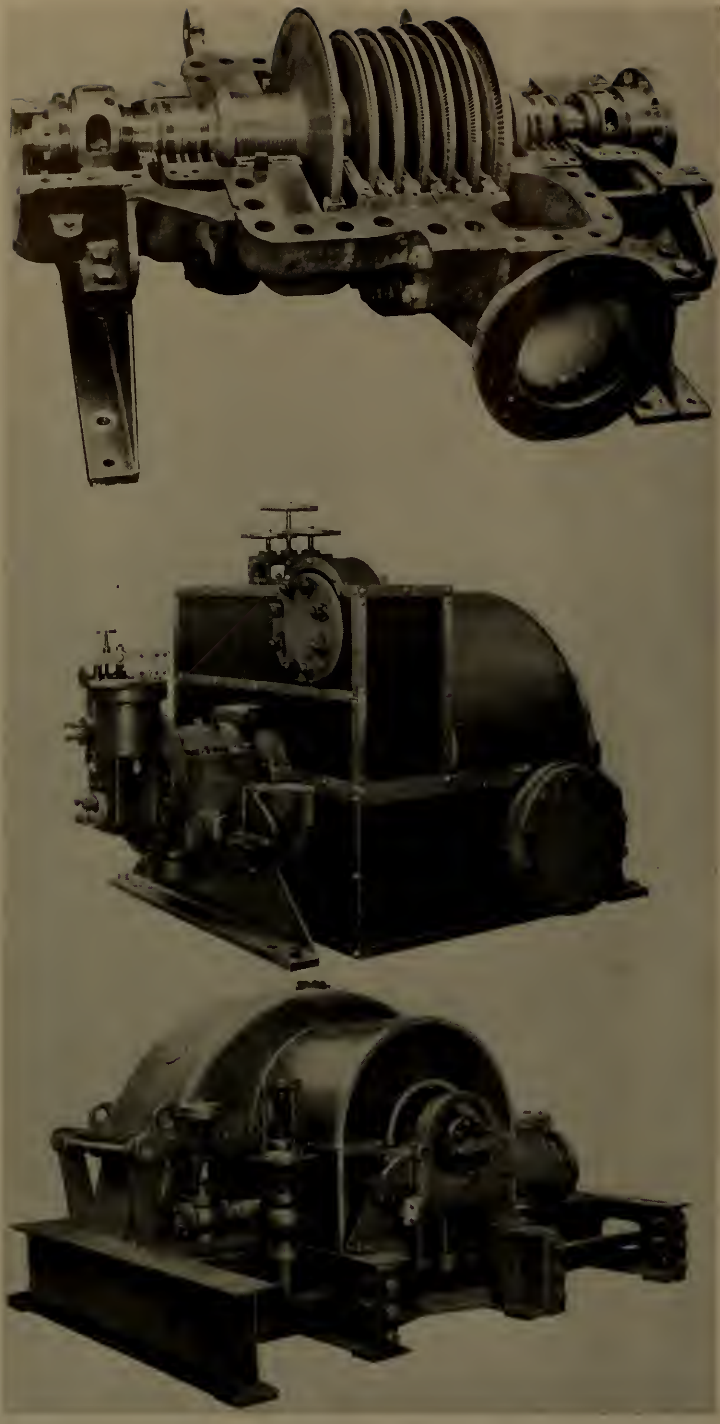
Steam generator tubes	3,000 sq. ft.
Economizer tubes	2,970 sq. ft.
Superheater tubes	277 sq. ft.

Each boiler is normally rated at a capacity for 17,500 lbs. of saturated steam per hour. Each of the boilers has a maximum capacity for generating 50,000 pounds of saturated steam or 35,000 pounds of superheated steam in an hour.

These boilers are to be fitted with: Todd Combustion Equipment Company mechanically atomized fuel oil burners of the Hex Press type; Vulcan soot blowers; Wager smoke indicators; and Swartwout feed regulators. They will be served by motor-driven force draft fans.

From the boiler location aft of and above the turbines a comparatively short lead of seamless steel pipe carries the main steam line to the throttle valve controlling the high pressure turbine.

The propulsion turbine is of the General Electric Company's latest cross compound marine design, impulse type with solid rotors, and comprises one high pressure turbine and one low pressure turbine in



Three views of units of the General Electric marine type cross compound turbine of type to be installed in the new Associated Oil tanker.
Upper: High pressure turbine with casing removed.
Center: High pressure turbine with lagging in place.
Lower: Low pressure turbine with lagging in place.

series, one reverse element in the low pressure turbine casing, the gears and pinions necessary for speed reduction, and the valves and governing mechanism necessary for speed control.

With steam conditions of 375 pound pressure and 700 degrees Fahrenheit temperature at the turbine throttle, the normal rating of this unit is 3600 shaft horsepower at a propeller shaft speed of 85 revolutions per minute. The unit will be capable of operating continuously at a speed to produce 88 r.p.m. on the propeller shaft, which is equivalent to 3960 shaft horsepower.

At normal rating output the high pressure rotor and pinion will revolve at the rate of 6285 revolutions per minute and the low pressure rotor and pinion at 4919 revolutions per minute. The high speed gear and low speed pinion will revolve at 767, and the low speed gear and propeller shaft at 85, revolutions per minute.

As installed in the ship, the weight of this unit will be 127,000 pounds, of which the high pressure turbine accounts for 7000 pounds, the low pressure turbine 30,000 pounds, and the gears 90,000 pounds.

Thrust of the propeller shaft is taken on a Kingsbury thrust bearing built into the forward end of the low speed gear casing.

The design and construction of the low pressure turbine casing provides a steam distribution chamber for the condenser, upon which it will be mounted so that it exhausts directly thereinto.

Flanged connections are arranged for extraction of both high and low pressure steam for feed water heating purposes.

The main condenser will be a Foster-Wheeler two pass unit set athwartship under the low pressure casing of the turbine. It will have 4700 square feet of cooling surface, will be fitted with air ejectors, and will be served by an electric motor-driven circulating pump of the vertical shaft centrifugal type, having a capacity for 6200 gallons of salt water per minute. A centrifugal pump of the same type delivers the condensate to the hot well.

For the main feed pump there will be installed a steam turbine driven horizontal shaft two stage centri-

fugal with a capacity of 115 gallons per minute at 500 pound pressure. The auxiliary feed pump will be a vertical simplex double acting reciprocating steam unit of the same capacity.

Davis Engineering Company Para-coil heat exchangers will preheat the feed water.

● Fire Protection.

The engine-boiler room space will be thoroughly covered by the Lux System of fire smothering. Cargo tanks are to be fitted for the flue gas fire prevention system. This system fills all vacant spaces in the tanks with washed and cooled flue gas, thereby sealing the contents of the tanks from atmospheric oxygen and preventing fires or explosions.

All cargo tanks are fitted with Shand & Jurs breather valves, flame arresters, and automatic float gages.

● Cargo Pumps.

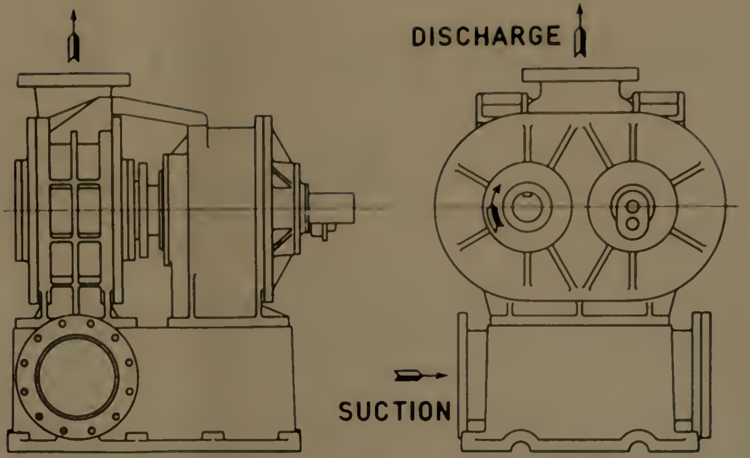
Three Kinney Heliquad Model G main cargo pumps are supplied for this tanker and one cargo stripping pump. Each of these pumps is equipped with horizontal duplex suction connections and with a vertical discharge.

Each main cargo pump has a capacity of 3000 bbls. an hour against a maximum pressure of 125 to 150 pounds, handling all grades of petroleum products from gasoline to fuel oil. The stripping pump has a capacity of 1000 to 1200 bbls. an hour.

These pumps have bronze cylinder and head liners and are unusual in the rotary pump field in that all bearings as well as the timing gears are entirely outside of the pump chamber and yet have only two stuffing boxes instead of four as is usually the case.

The bearing design is such that the position of the rotors is maintained central in the pump housing regardless of the trim of the vessel. This prevents metallic endwise contact.

This new design maintains other features regularly supplied with Kinney Heliquad pumps, including labyrinth rings and chamber connected to the suction side of the pump, thus requiring that pumps be packed against suction pressure only. In addition, each stuffing box is fitted with a lantern or seal ring connected to a suitable external lubricator which provides a simple method of applying lubricant to the stuffing boxes. The packing runs on stellite shaft sleeves.



Diagrammatic elevations of Kinney Heliquad oil cargo pumps.

Timing gears and bearings operate in a separate oil tight case with a combination of splash and flood lubrication provided by a small built-in rotary pump.

Bearings, nearest to the pump chamber, are the latest development in solid roll, heavy duty, industrial roller bearings; duplex heavy duty precision ball bearings are used at the coupling end of the unit.

These pumps are direct connected through flexible couplings and reduction gears to General Electric high speed steam turbines.

The cargo discharge piping system is designed to take care of the special problems involved in handling four petroleum commodities in the same tanker. Fuel oil, diesel oil, gasoline, and kerosene can be carried and discharged simultaneously without contamination.

● Deck Auxiliaries.

The steering gear will be of the latest type electro-hydraulic type built by the American Engineering Company, and the same firm will furnish a standard reciprocating steam drive windlass.

Four power drive gypsey heads will be installed, one on the forecastle head and three on the poop deck aft. Each of these is driven by an engine on the deck below through a vertical shaft. The three gypseys aft are of the Associated combined bollard type which has a bollard on the same bed plate that supports the gypsey shaft bearing. This type has been found very suitable for adjusting hawsers when taking oil at out port moorings such as Ventura and Monterey, California.

● On the Bridge.

Steering control will be furnished by a Sperry two unit type Gyro Pilot. Compass equipment will include a Sperry Gyro Compass of the new Mark XIV type with thermionic follow up, three bearing repeaters, one steering repeater, one radio repeater, one rudder indicator, and one course recorder.

An incandescent spot type Sperry searchlight will be installed.

A Submarine Signal Company Fathometer will provide continuous echo sounding and visual depth indication.

Mackay Radio and Telegraph Company will supply the wireless equipment, including: a 500 watt combination intermediate and high frequency transmitter; an all wave receiver and a crystal receiver; a Kolster radio direction finder; a radio auto-alarm; and a 500 watt emergency transmitter with current supply from an Exide 6-volt storage battery.

An A. Lietz electric sounding machine will be installed.

Government Aid in Preventing Injuries

By Jewell W. Swofford,

Chairman, U. S. Employees' Compensation Commission

The National Safety Council has undoubtedly accomplished more in the cause of safety than any other single agency, and this has been due in large measure to the intelligence, knowledge and interest of the individual members directed by the Council into a united force against this enemy of society. It has brought about the conversion of the public to the idea of safety. This is, of itself, a major accomplishment, but now a more important work remains to be done—the Council must point the way in putting the safety idea to work. This is probably the principal subject on the agenda of the various sectional meetings of the Congress.

The Marine Section of this Congress is particularly concerned with the problem of safety as it affects a number of different industrial operations, maritime in character. Included in this classification are stevedoring and ship repair work upon the navigable waters of the United States. Many thousands of workers are engaged in these employments throughout the United States and its territories, and more than 40,000 of these employees were reported injured during the twelve months ended June 30, 1937. Prevention of this terrific loss in man-power, with the suffering and distress that marks its trail, is the problem which engages this section at this time. It is one which challenges all the intelligence at our command.

Cause for Astonishment.

As chairman of the United States Employees' Compensation Commission during the past four years, I have noted with ever-increasing concern the number of injuries reported to the Commission annually under the Longshoremen and Harbor Workers' Compensation Act. It is difficult to believe that so many men should be needlessly disabled for life or killed as a part of the everyday routine of such industrial operations. But the records are available, and in all too many instances the reported cause of injury is also a cause for astonishment. Many of those charged with the responsibility for directing these large industrial operations seem indifferent to the tremendous increase added to operating costs by industrial accidents. The word "indifferent" is used because so little appears to have been done by these employers to eliminate this heavy charge against their business. There is also another side to the picture. The workers themselves seemingly have been content to risk life and limb day after day with little regard for their own safety, for they have contributed little to promote safe working practices. Here is a situation difficult to understand. In order to investigate it, I have visited docks and vessels to see at first hand how these operations were conducted and secured from employers and employees their views on this perplexing condition.

There appears to be but one tenable explanation for the situation I have just outlined. Apparently we must charge the responsibility for it to an indifference on the part of a great number of employers and employees to circumstances affecting their own best interests. The industrial operations we are considering, like other commercial enterprises, are operated for profit. The employer is in business to make money, and his employees give their skill and labor for the same purpose. Alertness to reduce operating costs and to develop new methods and procedures that promise greater profits is the mark of an intelligent employer. And at the same time the intelligent employee is eager to increase his annual income and to provide security for his family. There is a mutual interest involved between these two in all matters of common concern, and certainly a business is neither directed rightly nor operated intelligently when either employer or employee is apathetic towards the development of accident prevention methods for the industry in which both are engaged. Such an employer fails to take advantage of the opportunity to reduce operating costs and to increase profits directly through savings in compensation costs and indirectly through greater efficiency on the part of his operating personnel. Such an employee fails to take advantage of the opportunity to increase his earning power directly by escaping periods of incapacity for work due to injury. The proof of possible profit through accident prevention in industrial operations is so overwhelming that it should be one of the first considerations of every business executive and every wage-earner.

But it is not the first consideration, and, in the case of many concerns, it seems to be far down the list of those things that should be given attention. It is distressing and, to the weak of heart, discouraging to observe how little concern industry primarily, and labor, also, seem to give to this important principle of safety. The question arises, "What

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[Address Marine Section, 26th National Safety Congress, Kansas City, October 14, 1937.]

to Longshoremen and Harbor Workers

can be done about it?" "How can injuries be prevented among longshoremen and harbor workers, and what aid can the Federal Government extend in this respect?"

● Federal Responsibility.

The employments we are discussing are within the scope of Federal authority, and within the purview of The Longshoremen and Harbor Workers' Compensation Act. The thousands of industrial workers engaged in these enterprises are confronted daily with the possibility of accident while at work. The Federal Government must assume responsibility for protecting the physical well-being of these workers since this responsibility may not be exercised by the respective states. It is my conviction, therefore, that it is clearly the duty of the Federal Government to aid actively in the prevention of accidents in these industries.

There appears to be two methods by which the Federal Government may discharge this obligation. It may be able to do so by cooperation or, this method failing, it apparently must do so by compulsion. To my mind, the first method is preferable if it can be made to work successfully. I make this observation conditionally, and I raise the question as to the effectiveness of this method because the answer rests entirely upon the willingness of industry to extend its full cooperation to the Government by undertaking to accept and enforce suitable safety regulations. If the industry as a whole extends this measure of cooperation, and will unite in adopting and enforcing approved safety standards and practices in all of its operations, the cooperative method can be made to work in an acceptable manner.

Under this plan of cooperation the Government must do its part. In behalf of the industry it must determine the cause of accidents, prepare safety standards and develop methods and practices for making them effective. The United States Employees' Compensation Commission, under the authority conferred upon it by the Longshoremen and Harbor Workers' Act, apparently is authorized to render this assistance. The law authorizes the Commission to study and investigate safety provisions and the causes of accidents, and to make to the Congress of the United States and to employers and insurance carriers recommendations for preventing such accidents.

Acting pursuant to this authority and subject to the limited financial resources available to it, the Commission has endeavored to sell the idea of safety to employers engaged in longshore and harbor work and to assist the industry in making voluntary safety plans effective. It is a regrettable fact that the response of the industry as a whole to this proffer of assistance has proved disappointing. For some reason, which is not apparent, the industry has failed to unite for the purpose of cooperating in the development of accident prevention methods. On the Pacific Coast and in certain ports of the Gulf Coast a keen interest has been shown, and the employer and employee organizations have cooperated in developing safe working practices and in providing methods for the voluntary enforcement of approved safety codes.

● Pacific Coast Leads

The Accident Prevention Bureau organized by Marine Associations on the Pacific Coast furnishes an example of successful cooperative effort in formulating and administering a voluntary safety code for the prevention of accidents in maritime employments. The form of organization and the methods of enforcement that have operated there with such marked success appear equally appropriate for other sections of the country. It requires only the sincere desire of employers and their willingness to coooperate with one another to make similar associations equally effective in other localities.

However, as previously stated, the industry as a whole has been apathetic toward efforts to bring about voluntary safety regulation, and the sections which have responded favorably represent only a minority of the industry. The ports on the Atlantic Coast have not undertaken similar safety programs. It is from these ports that nearly 54 per cent of the injuries were reported under the Longshoremen and Harbor Workers' Compensation Act during the year ended June 30, 1935. Some of the more progressive employers in these ports, acting individually, have installed safety departments and have established excellent safety records, but instances of this kind are the exception rather than the rule.

There must be a decided increase in interest shown by the industry as a whole before programs for voluntary accident prevention can be made to function properly. From contacts with leading employers I

(Page 46, please)

A Day at the Farm

By Michael J. Buckley

Foreword

The Family Club of San Francisco owns The Farm, at Portola, San Mateo County, a place of quiet meadows lush with hay and of enchanted woods filled with stately sequoias and giant oaks. Here it is their annual custom to stage the "Flight of the Stork," a pilgrimage back to nature by the children of the Family. The "Ever Faithful Hour of Music" has become one of the most appealing features of the "Flight."

For this feature of the 1937 "Flight," Mr. Michael J. Buckley of the Dollar Lines composed a beautiful poem entitled "A Day at the Farm," which was set to music by Alfred Arriola and rendered for the Family by Richard E. Doyle, Jr., and the Ever Faithful musicians.

So beautiful was this combination that two other children of the Family, Sidney M. Ehrman and John Henry Nash, conspired to make a beautiful and permanent record of the poem in book form. By permission of the author we reproduce the poem.

Introduction

Tick! tock! tick! tock!
Ageless, endless, song of the clock.

Hands that search its weary face,
Hands that find no resting place,
Tired, hopeless, patient hands
Tied to time's eternal bands,
Groping blindly round the clock,
Tick! tock! tick! tock!
Tick! tock! tick! tock!

Night is fading. Darkness leaves,
Shadows break along the eaves,
Morning draws the veil aside
To tell the day the night has died.
The cricket's hum's no longer shrilled,
The croaking frog has long been stilled,
The shades into the silence creep,
Sh! for a moment. Night's asleep!

Morning

Tick! tock! tick! tock!
Toneless song of the timeless clock.

Shadows lighten—drift away,
Drowsy murmurs open day.
Nature rising with a yawn,
Stretches her arms to greet the dawn,
And life and love burst into song;
For the day is short—the night is long
And noon's just into view.
The rooster crows from his perch hard by,
Cocksure his call. The day is nigh,
Arise!
Be awake with you!

The robin fresh from his sleepy bower,
Chirps his praise at his morning shower;
The linnet clears his velvet throat,
Taps his baton for the opening note,
And the sparrow joins, and the cooing dove,
And the meadow-lark in the song of love,
And the bullfinch, gripping the rustic rail
Lends his voice to the glad 'All Hail!'
The woodpecker hammers his rhythmic drums,
The bee round the opening flower hums,
The humming-bird, like the lightning darts,
Fills him with honey and departs.
And all is life, and strut, and song
Gladness thrills, for life is strong.

Look forward Youth to the years to come
'Tis dawn!
Arise!
For the day's begun!

Noon

Tick! tock! tick! tock!
Loud is the clamor of the clock.

The sun's climbed dizzily on high,
The blaze of noon is in the sky,
And nature, warmed to ecstacy,
Lavishes her abundancy.

The cows have wandered from the lea,
To seek the shelter of the tree,
The oak tree's grateful shade. The glare
Of noonday smites as with a blow,
The birds have gone to nest, as though
The warming sun's oppressing blaze,
Might wilt them with its ardent rays.
But, though the kine, and fowl, and bird
Retreat into the shade unheard,
The busy insect and the flower
Improve, as willed, each shining hour.

The bee with impatient ardor roams,
With honey stores its catacombs;
Woe to the interfering thing
That braves the anger of its sting.
The quivering air of midday shakes,
The locusts buzz among the brakes,
Blinding, glaring shafts of heat,
The orchards palpitating greet,
And buzz, and hum, and strident glare
The noonday sun meets everywhere,
The sun that says 'I rule the sky,
I wish to live!
I will to die!
I warm the timid, shrinking earth,
And nurse the suckling from its birth;
I wrap the earth in fleecy shrouds,
I send the lightning through the clouds,
Unloose the deluge and the rain,
Control the rivers and the plain,
I lord the hills, unfold the flower
I am the Life!
I am the Power!'

Time stands still at noonday peak,
Youth, in your glorious zenith—speak!

Evening

Tick! tock! tick! tock!
Restful hands around the clock.

Shadows gather on the hill,
The mirrored silver leaves the rill
As ripples on the tarn.
Sun rays, through the latticed leaves,
Caress the careless, tumbled sheaves
Beyond the rambling barn.
The granary of earth's upturned
To catch the coolness gratefully earned,
The distant blue to ashen gray,
Through crimson blinds forecloses day.

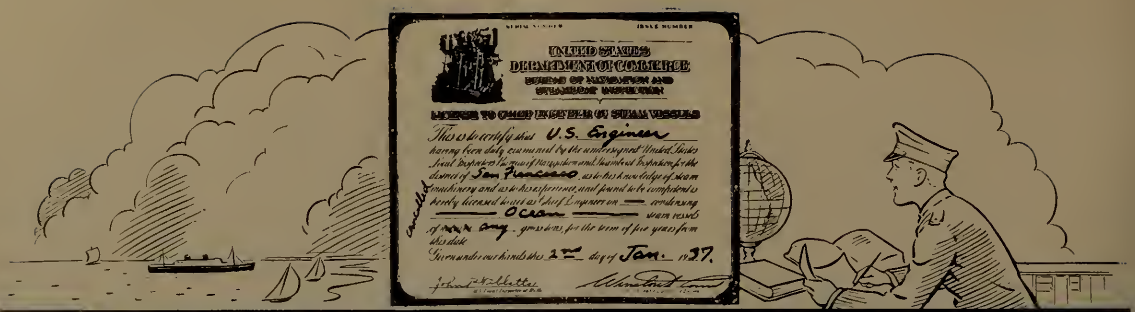
The insects sink to breathless sleep
The rabbits to their warren creep
As afternoon is spent. The wren
Flits chirping to its tiny nest
And scolds the gathering shadows. West
Above the farm, a whip-poor-will
Forlorn complains. Along the hill
The frogs in intermittent drone,
Match the crickets' shriller tone

The heather wraps its purple curl,
As broom and furze their yellows furl,
Their brilliance blends in evening gray
As nature puts its gauds away.
Somewhere an owl hoots. Or perchance
A bat flits by in fitful dance,
And through the silence gleams a star
As twilight falls on Portola.

Song of Twilight

I sing a song of twilight gray,
In sunset's flaming views,
Memories crowd the passing day
With thoughts the hour renews.
Open, glad is the road to fame,
Where Youth may have its leave,
Life is only a candle flame,
Frail as a soul's reprieve,
Blown out by a nomad, aimless breeze
In the moment of make-believe.

I hear a song of twilight thrush,
Neath changing, velvet skies,
Give me dreams at even hush
Of lands where romance lies.
Clouds that falter on the ridge
In ranks my dreams retrieve,
These are the armies of my thought
In the hour of make-believe,
The hour when fancy turns to real,
And real becomes make-believe.



Your Problems Answered

by "The Chief"

The word "Cancelled" was inscribed on face of the above license at the direction of the Bureau of Marine Inspection and Navigation. As used here it means "Specimen Copy."

QUESTION

What is the general theory of the screw propeller?

ANSWER

Many theories have been advanced. The theory that the propeller is a short threading tap, chasing along the inside threads of a long nut, deriving its thrust from direct reaction on the nut, is not entirely correct, although it is a first approximation.

A more nearly accurate theory is that the propeller is any device which grasps large volumes of water as it moves past and hurls it violently sternward. The thrust is derived from our old friend, the basic expression for force arising from acceleration, i.e., $F = \frac{32.2}{WA}$ when F is the force or thrust in pounds, W is the weight in pounds per second of the water which is accelerated sternwards, and A is the acceleration in feet per second per second.

The kinetic energy in the water due to its velocity represents a loss in propulsion efficiency, expressed by $E = \frac{W V^2}{32.2}$, where E is energy loss in foot pounds, W is weight of water pounds per second thrust sternward, and V is its relative velocity in feet per second with respect to the surrounding stationary water. Obviously to reduce this loss we must reduce the velocity to a minimum and obtain the necessary thrust by grasping as large a weight of water per second as possible. This means that the propeller should be as large in diameter as possible, and thrust on as large a column of water as possible. Diameter is limited by draft of ship and necessity of keeping the entire propeller below water to prevent cavitation, discussed later.

Necessity of having acceleration gives rise to the propeller slip, as with no slip there will be no acceleration of water sternward, hence no thrust.

QUESTION

What are the factors entering into the performance of a screw propeller?

ANSWER

There are a great many, so many,

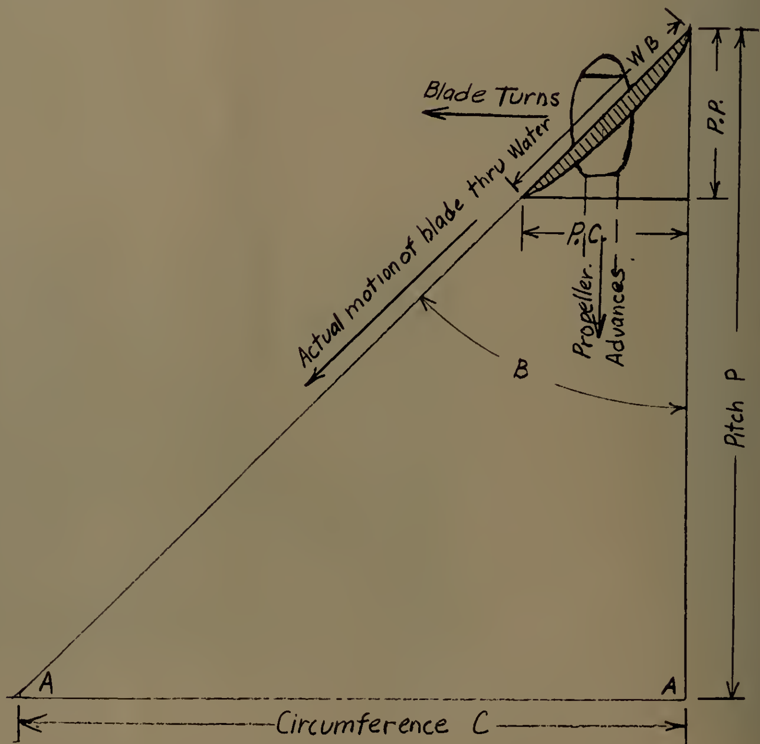


Fig. 1.

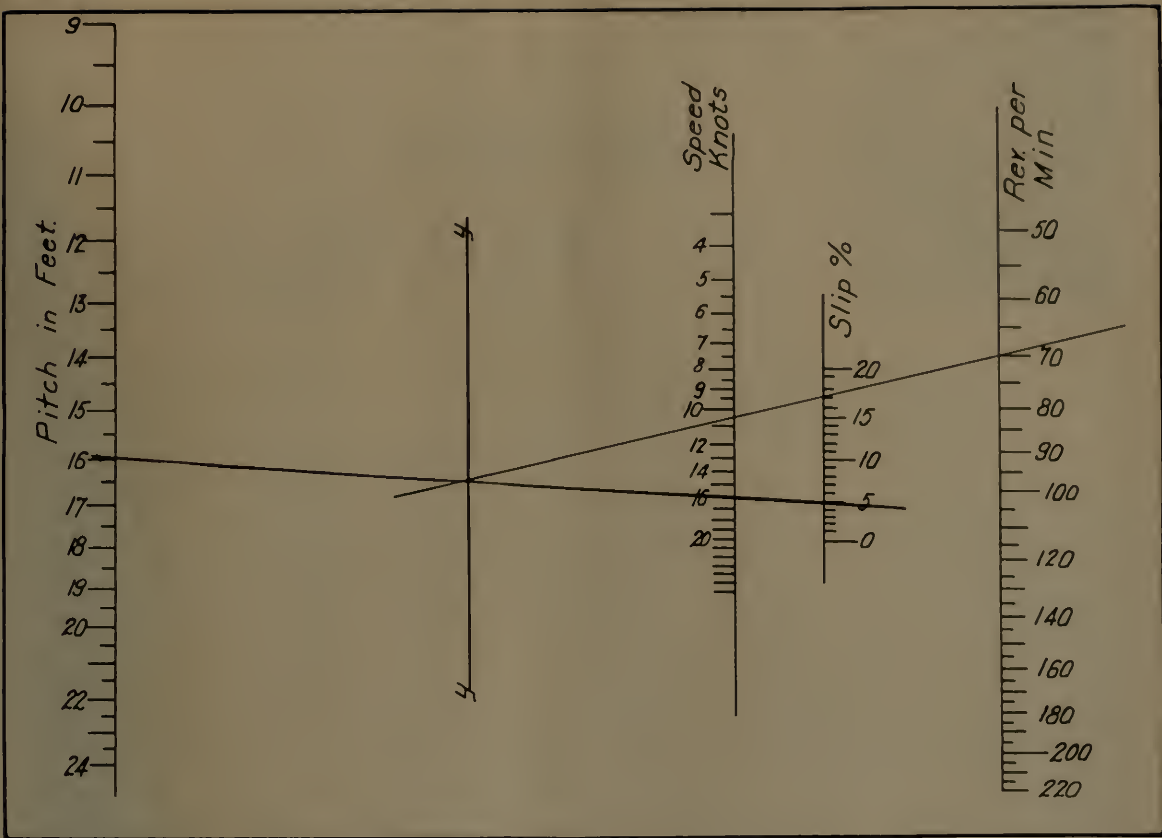


Chart for speed, slip and pitch.

in fact, that it is a very complex problem. So many of the qualities are mutually opposed to each other that propeller design at best is a compromise in which some desirable qualities are sacrificed to obtain other more desirable ones. Some of these factors are:

1. The form of the underwater body of the ship.
2. Location of propeller in relation to the hull.
3. Diameter of propeller.
4. Pitch of propeller.
5. Projected blade area.
6. Revolutions per minute.
7. Speed of ship.
8. Speed of advance of propeller in relation to the water at the stern in which it is working.
9. Shaft horsepower.
10. Density of the water.
11. A factor representing the streamline valve of the shape of the blade.
12. A factor representing the friction of the blade sliding edgewise through the water.
13. The depth of propeller in water in relation to its diameter.

QUESTION

What is the pitch of a propeller?

ANSWER

The distance in feet it would be thrust forward in one revolution if working in a non-yielding substance. Similar to the distance in feet between the threads of a large screw.

QUESTION

How is pitch measured and calculated?

ANSWER

By measuring in inches the distance fore and aft between the leading edge and the following edge of the blade at one or several points along the axis of the blade.

A true pitch blade has the same pitch at all points from just outside the hub to the tip of blade. Some propellers have an increasing pitch as the tip is approached, but the merit is doubtful.

The width of the blade is measured at the same point that the fore and aft measurement is made. Also the distance from the center to the point of measurement is taken in feet, and twice this gives the diameter to be used in the calculation.

Refer to Fig. 1. The fore and aft measurement is really a part of the whole pitch marked PP. The width of blade is marked WB.

PC, or part of the circumference, is then calculated by the right triangle relationship where

$$PC = \sqrt{WB^2 - PP^2}$$

Then from geometry we know that

$$\frac{P}{C} = \frac{PP}{PC}, \text{ hence } P = C \times \frac{PP}{PC}$$

C is calculated by multiplying the diameter at which the measurement is taken by 3.1416, or C = D x 3.1416

If diameter, hence circumference,

(Page 60 please)

For American Deck Officers

Transition to the Modern — Some Impressions of an Old Timer

The other day an old sailing ship master visited the Merchants' Exchange and announced that he was eighty-five that day. From his walk and appearance you would not have guessed his age by ten years, as he stood straight and was in good health. He was bemoaning the fact that his old friends were not in evidence as in years gone by, when this spot was the gathering place for the sailing vessel masters that were in port at San Francisco.

Someone asked when he had last gone to sea, and he said he had retired thirty years before and since then had enjoyed himself by staying home, and anyway he would not want to go to sea any more as the sailors of today were only sailors in name; that they were protected from weather and never got their feet wet.

Someone took the part of the present-day officer and tried to explain the difference of today, where the ship's officers worked under the tension of speed, quick turn-around, and the fact that close schedules had to be maintained regardless of weather or conditions, not as they were forty years ago, when a vessel would be in port anywhere from twenty to thirty days on each arrival.

Getting nowhere trying to convince the old fellow, it was suggested that he go on a modern liner now in port and have the captain of that vessel explain to him the workings as they are at present.

With a good deal of reluctance our grand old sailor was driven down to one of the piers to meet the master of an up-to-date liner. Riding up in the elevator, he commented on the fact that people could not even take the time to walk upstairs. It was explained that it was seven decks up to the bridge, and that elevators were a necessity rather than a novelty.

After an introduction to the captain of this liner, the captain offered to take our elderly guest over the ship, beginning below and going through the galley, dining room and public rooms, explaining as they went along the work and material used, as well as the number of people carried each voyage and the manner in which they are fed and cared for. After this part of the vessel had been gone over we started forward to go on the bridge.

Upon entering the bridge the first explanation was on the gyro compass and the automatic steering gear, or "metal mike." His interest was great, and he asked if it could steer as well as a man. And after referring to the course recorder chart for part of the previous voyage and seeing where there were courses steered with small variations, he expressed amazement and wished they had made something like that in his time.

While they were explaining the workings of the automatic fire alarm system, one of the officers went below and lit a pipe in a compartment from which the smoke detector recorded, and on seeing the smoke in the cabinet and being able to tell from which compartment it came without leaving the bridge the old man could only stand and look, and the fact that the automatic fire alarm recorded the number of the stateroom where heat was in excess of 140 degrees was beginning to make him wonder. At this time he explained that the only temperatures they ever got on a sailing vessel was that at times when carrying coal cargoes

Changes of Masters

Steamer Captain A. F. Lucas: Don Thomson; Vice, C. A. Peterson.
Steamer Minnesotan: J. A. McAvoy; Vice, John Norberg.
Steamer J. C. Fitzsimmons: S. S. Dunnell; Vice, E. K. Smith.
Steamer North Wind: Johannes A. Beck; Vice, S. K. Gilje.
Steamer President Harrison: S. E. Cullen; Vice, R. J. Ehman.
Steamer Nebraskan: E. S. Sutton; Vice, W. M. Strong.
Steamer James Griffiths: S. K. Gilje; Vice, J. Johannson.
Steamer Alabaman: J. L. Thompson; Vice, L. C. Hansen.
Steamer Admiral Nulton: W. Carlsen; Vice, G. A. Harris.
Steamer Point San Pedro: N. A. Nielsen; Vice, Gus Illig.
Steamer Carolinian: D. W. Hassell; Vice, J. H. A. Gries.
Steamer Talamanca: K. N. Bauer; Vice, W. W. Koch.
Steamer Nebraskan: W. M. Strong; Vice, E. S. Sutton.
Steamer Robert Luckenbach: Ralph McKinnon; Vice, C. A. Bergman.
Steamer Susan V. Luckenbach: Axel V. Hakansson; Vice, G. C. Bown.
Steamer Diamond Head: W. G. Leithead; Vice, O. Bergman.
Steamer Lillian Luckenbach: G. C. Bown; Vice, H. B. Thurlin.

on long voyages a pipe would be placed in the corner of the hatch and about once a week a thermometer dropped down to see if heat were generating.

Now an explanation of the operation of the water tight doors from the bridge, where all doors could be closed simultaneously or each door could be closed separately. Next the automatic sounding machine, and of all the equipment this perhaps made the greatest impression. He asked many questions, one of which was whether you could depend on it. When assured that the difficulties with these various pieces of equipment were very small, the only thing that our visitor could say was, "Don't it beat all!"

The fact that sound transmitted from the bottom of the vessel went to the ocean's bottom and was picked up again and recorded by a flash on a dial that would accurately show the depth in fathoms, brought forth his explanation of how they would get out the deep sea lead line when approaching shore in uncertain weather and take the lead forward to the fore rigging with part of the lead line, then drop the lead and, with men stationed on the poop, get the depth, then have to haul the 40 pound lead up again by hand, the whole operation taking twenty to twenty-five minutes to get a sounding of 90 fathoms; but here in a matter of seconds you received a record of soundings that showed the minute the depth was shoaling.

The radio direction finder was another piece of equipment that was in for its share of praise, after it was explained how it operated and the results that had been obtained over a period of years.

Seeing that the old man was getting tired, the captain of this liner invited him to sit down in his cabin, and as they talked the old ship master expressed wonderment in the advancement of modern equipment, the speed that the vessels made on their runs, and the number of passengers carried.

"You know," he said, "in our time the fresh food was gone in 48 hours, and from then on it was salt and canned food; but now you have everything; in fact, many things that people do not have ashore. And I have a greater respect for ships' officers than I did this morning. After going over this vessel I can see where they must be up on all details, and that I would be as much lost on a ship of this kind as you would be if you went on the type of vessel I was on years ago. Before leaving and thanking you for taking me around, I want to express to you and all American Merchant Marine officers the wish that they carry on and advance as rapidly as they have in the thirty years I have been away from the sea."

Engineers' Licenses

The following list shows the licenses granted during the month of October to engineer officers of the merchant marine at Pacific Coast offices of the Bureau of Marine Inspection and Navigation. For key to abbreviations see footnote.

Name and Grade	Class	Condition
JUNEAU		
Irl M. Green, 3d Asst. Eng.	OSS, any GT	O
Maxwell J. Short, 3d Asst. Eng.	OSS, any GT	O
Arthur P. Jacobi, 2nd Asst. Eng.	OSS, any GT	O
PORTLAND		
William C. Hornor, 2d Asst. Eng.	OSS, any GT	O
Charles D. Cook, 1st Asst. Eng.	OSS, any GT	RG
SAN FRANCISCO		
Francis O. Henrickson, Chief Eng.	OSS, any GT	RG
Edward R. Hoffman, Chief Eng.	OSS, any GT	RG
John M. Dodds, Chief Eng.	OSS, any GT	RG
Thomas M. Proctor, 1st Asst. Eng.	OSS, any GT	RG
Michael Filzer, 1st Asst. Eng.	OSS, any GT	RG
Wilfred F. Nolte, 1st Asst. Eng.	OSS, any GT	RG
Lloyd Coughlin, 1st Asst. Eng.	OSS, any GT	RG
Laurens W. Hunnicutt, 2nd Asst. Eng.	OSS, any GT	RG
Martin E. Basner, 2nd Asst. Eng.	OSS, any GT	RG
Robert E. MacNeal, 3d Asst. Eng.	OSS any GT	O
John R. Thompson, 3d Asst. Eng.	OSS, any GT	O
Rudolph A. Rutz, 3d Asst. Eng.	OSS, any GT	O
Thorwald G. Hansen, Chief Eng.	OMS, any GT	O
Virgil J. Broughton, Chief Eng.	OMS, any GT	O
Elzie L. Carter, 1st Asst. Eng.	OMS, any GT	RG
Harry K. Short, 2nd Asst. Eng.	OMS, any GT	O
SAN PEDRO		
Henry J. Smith, Chief Eng.	OMS, 500 GT	RG

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Deck Officers' Licenses

The following list shows the licenses granted during the month of October to deck officers of the merchant marine at Pacific Coast offices of the Bureau of Marine Inspection and Navigation. For key to abbrevi breviations see footnote.

Name and Grade	Class	Condition
SEATTLE		
Herbert N. Cosper, Master	OSS, any GT	RG
Robert H. D. Curry, Master	OSS, any GT	RG
John R. Kean, Chief Mate	OSS, any GT	RG
Thomas D. Luosey, Chief Mate	OSS, any GT	RG
George Dakserhof, 2nd Mate	OSS, any GT	O
JUNEAU		
Delphy A. Knutsen, 3d Mate	OSS and OMS, any GT	O
PORTLAND		
Delmer Anholt, 2nd Mate	OSS, any GT	RG
SAN FRANCISCO		
Charles A. Kacocha, Master	OSS, any GT	RG
Charles L. Bisbee, Chief Mate	OSS, any GT	RG
Warren F. MacKenzie, Chief Mate	OSS, any GT	RG
Elmer F. Heine, Chief Mate	OSS, any GT	RG
Carl Heil, Chief Mate	OSS, any GT	RG
Fred A. Steele, Jr., 2nd Mate	OSS, any GT	RG
George A. Hanson, 2nd Mate	OSS, any GT	RG
Edmund Jensen, 2nd Mate	OSS, any GT	RG
Francis D. Wood, 3d Mate	OSS, any GT	O
Robert J. Gjedsted, 3d Mate	OSS, any GT	O
SAN PEDRO		
Earl A. Clark, Chief Mate	OSS, any GT	RG
Thomas O. Cullins, Jr., Chief Mate	OSS, any GT	O
Emil Harby, Chief Mate	OSS, any GT	RG
Clyde O. Hicks, Chief Mate	OSS, any GT	RG
Carl Aultman, 3d Mate and Pilot	OSS, any GT	RG

Abbreviations: GT is gross tonnage; RG is raised grade; O is original license; OSS is ocean steamer; OMS is ocean motorship.

Propellers and *Propelling Machinery*

Maneuvering Characteristics During Stopping and Reversing

By Walter E. Thau

Marine Department, Westinghouse Electric & Manufacturing Company

The purpose of this paper is to consider the R.P.M.-torque characteristics of the principal types of propelling machinery in relation to the torque characteristics of the propeller during stopping and reversing. Obviously the R.P.M.-torque characteristic of the propeller varies considerably in the many classes of ships. The peak torque required to stop the propeller varies from nearly full load value in the case of high-powered, high-speed, high-inertia ships to zero in the case of low-powered, low-speed ships. It also depends upon the propeller design.

Curve A in Fig. 1 shows the propeller torque characteristics of the U.S.S. Delaware's propellers as determined by model tests and published by Admiral C. W. Dyson and Admiral S. M. Robinson. The torque values of this curve are based on the ship maintaining full speed through the water and also on the assumption that cavitation does not take place. Check tests were made on the former collier Jupiter (now the U.S. S. Langley) and published by the same authors. The Jupiter's curve is also on the basis of the ship maintaining full speed during the reversal of the propellers. The check points of the Jupiter's curve verify the shape and values of the Delaware's curve.

Since the speed of the ship retards somewhat during the operation of stopping and reversing the propellers, curve B has been constructed as an assumption of what actually takes place in practice in the case of a ship like the Delaware. Observations on some of the large turbine-electric ships in which the stopping and reversing torque characteristics of the electrical system are practically constant also verify the shape of the curve. It is, therefore, believed that curve B can be regarded as

[Paper presented at the annual meeting of The Society of Naval Architects and Marine Engineers at New York, November 18 and 19, 1937.]

TABLE 1.—SHIP REVERSING TRIAL DATA

Item	Type of ship	Trial displacement, tons	Length, feet	Beam, feet	Total trial S.H.P. Ahead	Total trial S.H.P. Astern	No. screws	R.P.M. Ahead	R.P.M. Astern
1	P-C	21568	574	80	11400[1]	13100	2	104	100
2	P-C	21726	574	80	10200[1]	13140	2	100	95
3	P-C	21825	574	80	11700[1]	...	2	105	86
4	P-C	24330	615	81	19100[2]	...	2	120	101
5	P-C	22947	615	81	19100[2]	17840	2	120	98
6	P-C	8547	415	60	7000[3]	...	2	115	81
7	P-C	8790	415	60	5350[3]	...	2	106	87
8	P	6612	387	61	7700[4]	4192	2	155	105
9	P	6658	387	61	9800[4]	4210	2	167	102
10	P-C	6750	385	57.5	4050[5]	...	1	90	65
11	P-C	6765	385	57.5	5650[5]	3450	1	99	85
12	C	4680	390	55	2570[6]	...	1	85	68
13	C	4790	390	55	2750[6]	...	1	87	74
14	T	16777	439.5	66.5	3000	1250	1	90	45
15	T	16777	439.5	66.5	3000	1250	1	90	45
16	P	25150	705	86	36620	13900	2	129	80
17	T	19633	498	67	9223	10216	2	92	114
18	T	17860	485	62.5	3160	...	1	78	...
19	P-C	13200	535	72	12126	4600[D]	2	114	76
20	P-C	11660	523	62	5670	...	2	105	56
21	T	20837	500	65.75	4409	2000[D]	1	78	...
22	P-C	10380	505	63.75	14602	...	2	123	...
23	P-C	12783	508	70.75	17935	...	2	146	109
24	P-C	6750	404	57.5	8273	...	1	110	65
25	P-C	6700	403	61	13632	...	2	185	132
26	P-C	10500	475	61.5	7400	...	1	98	65

NOTE: P-C = Passenger and Cargo; P = Passenger; C = Cargo; T = Tanker.

TABLE 1 (*Continued*).—SHIP REVERSING TRIAL DATA

Item	Knots Ahead	Knots Astern	Propelling unit	Time to stop screws, min.:sec.	Time to full R.P.M. astern, min.:sec.	Time ship dead in water, min.:sec.	Time to full knots astern, min.:sec.	Head reach, feet	Ratio head reach to length
1	17.2	..	TE	0:30	1:15	2:50	..	2000	3.5
2	16.5	..	TE	0:20	2:00	2:10	..	..	..
3	17.3	..	TE	0:28	3:00	3:00	..	2300	4
4	19.1	..	TE	0:30	3:40	2:36	..	..	..
5	19.1	..	TE	0:20	2:37	2:40	..	2150	3.5
6	17.8	..	TE	0:45	1:50	2:24	..	1625	3.9
7	16.7	..	TE	0:37	2:20	2:06	..	1700	4.1
8	18.6	..	GT	1:33	5:33	3:32	8:33	2730	6.3
9	19.7	..	GT	1:18	4:48	3:12	7:18	2320	6.0
10	16.2	..	GT	0:55	3:50	3:59	..	1800	4.6
11	17.3	..	GT	2:30	5:10	5:41	..	3870	10.0
12	14.3	..	GT	1:35	4:35	4:35	..	2900	7.5
13	14.6	..	GT	0:36	3:18	3:18	..	2040	5.2
14	12	..	GT	0:28	..	..	..	..	..
15	12	..	GT	0:35	2:25	..	..	..	..
16	22.7	15[D]	GT	0:35	1:35	3:00	..	..	..
17	15.3	..	TE	0:15	6:15	3:03	..	2050	4.1
18	11.1	..	RE	.	..	3:34	..	1200	2.5
19	18.5	..	GT	0:35	8:00	3:40	..	2450	4.6
20	14.8	..	RE	..	..	2:26	..	1500	2.9
21	13.3	8.5[D]	GT	0:30	1:00	..	..	..	..
22	19.6	..	TE	..	..	..	..	..	..
23	21	..	TE	0:46	4:00	2:35	4:0	..	..
24	18	..	GT	0:55	2:35	3:59	..	..	..
25	21.3	..	GT	1:32	7:00	3:32	7:00	..	.
26	17	..	GT	0:37	3:20	4:30	6:05	..	..

NOTE: TE = Turbine electric (AC); GT = Geared turbine; RE = Reciprocating engine.

[1] Actual full power, 17,000 shaft horsepower. Designed speed, 18 knots.
[2] Actual full power, 26,500 shaft horsepower. Designed speed, 20 knots.
[3] Actual full power, 10,500 shaft horsepower. Designed speed, 17.5 knots.
[4] Actual full power, 11,400 shaft horsepower. Designed speed, 20 knots.
[5] Actual full power, 7,500 shaft horsepower. Designed speed, 16 knots.
[6] Actual full power, 3,150 shaft horsepower. Designed speed, 13 knots.
[D] Designed.

typical for such vessels, although not necessarily representative of the most extreme cases. For this reason it is used as the basis for the present discussion.

The top of the curve represents the ship going ahead at full speed. When power is taken off the propeller the revolutions per minute drop quickly to 63 per cent at the point a. From a to c, the propeller acts as a water turbine and reverse or braking torque must be applied to bring it to rest. The energy represented by a b c d must be dissipated by the propelling machinery. From the point c the torque required to drive the propeller in the astern direction rises rapidly as the revolutions per minute are increased.

Curves C to H, inclusive, show the R.P.M.-torque characteristics of the various types of propelling machinery.

Curve F is that of a geared turbine having one Curtis wheel and one Rateau wheel, each in a separate casing, for ahead operation, and the same arrangement for astern operation. Full power is obtainable in either direction with full ahead steam flow. The values are calculated from test data on an actual unit and are based on full ahead steam flow.

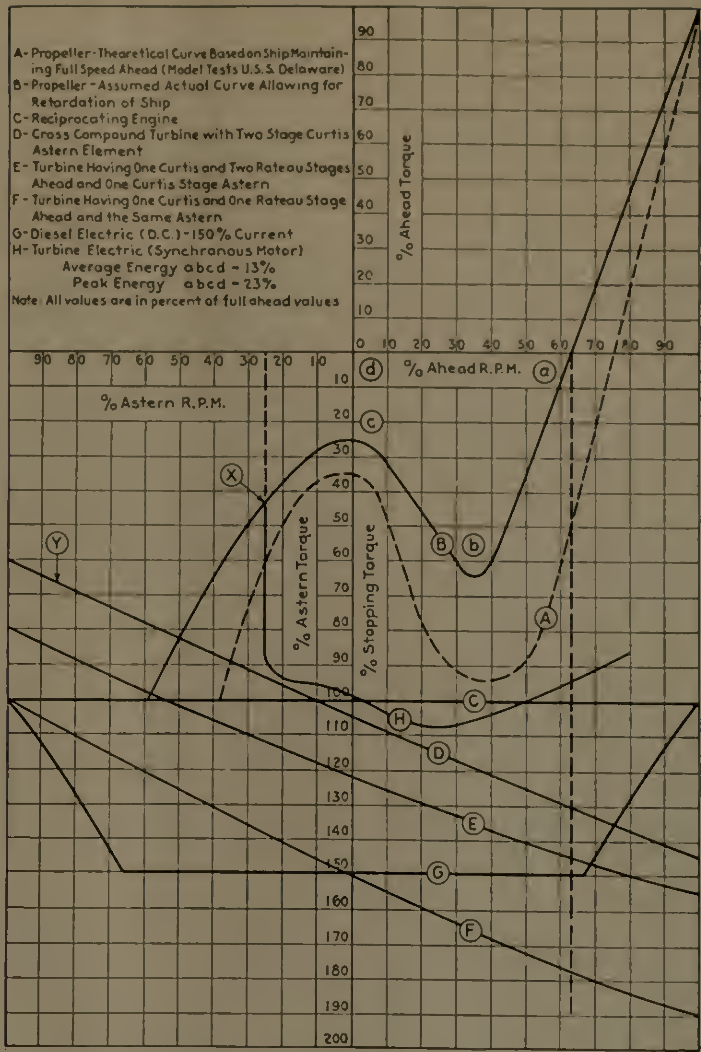
The torque values of curves D, E and F may be increased approximately 25 per cent by increasing the steam flow by 25 per cent.

Curve H shows the characteristics of a turbine electric drive using a synchronous motor. The steam flow in this case varies considerably during the cycle of reversal, being practically nil until the propeller is stopped and just sufficient after the propeller reverses to take care of the propeller load and acceleration of all rotating masses from the turbine to the propeller.

Curve H is also representative of a diesel-electric drive using alternating current.

By an examination of the curves it will be seen that all of the drives shown have more than ample torque performance characteristics to overcome the torque requirements of the propeller.

The energy represented by the area a b c d is the propeller effort which must be overcome, and it must be absorbed in the system. The energy between the a b c portion of curve B and the various propelling machinery performance curves represents the energy available for overcoming the inertia effects of the driving machinery.



Torque characteristics of various types of marine propulsion machinery.

In the case of the steam mechanical drives all braking energy required to stop the rotating masses and also that required to overcome the propeller torque characteristics must be dissipated in the systems. In the case of the synchronous motor electric drive it must be dissipated in the motor windings. In the case of the engine drive it must be dissipated in the engine. In the case of diesel-electric and turbine-electric direct-current drive using the voltage control system, it is returned as regenerative power to the prime mover generating set and absorbed by the exciter auxiliary load and to help overcome frictional and other losses.

The average energy represented by the area a b c d is approximately 13 per cent of full load, whereas the peak energy value at the point b is only 23 per cent of full load. It therefore follows that the actual energy required to stop the propeller is relatively very small. That the peak torque at b actually occurs is evi-

denced by the marked observable increase in the rate of deceleration after that point has been passed; i.e.. over the portion between b and c.

Although the synchronous motor drive and the engine drive have lower torque characteristics at the braking portion, they also have the least stored energy to overcome and hence their stopping characteristics are good. The same applies in the astern operation, where either will supply full load torque.

While the turbine drives have excellent braking torque characteristics, they also have greater stored energy to overcome.

It is well known that a reciprocating engine can be stopped, reversed and brought up to speed in less time than systems having the greater inertia effects to overcome. It is also well known that when these maneuvers are done too quickly the propeller loses its hold on the water and with that it loses its maneuvering power. The engineer who handles his engine reversals slowly and carefully obtains the desired results in maneuvering his vessel. Considering the low inertia of the motor of a direct-current, voltage-control system such as is used in diesel-electric tugboats, this system has the best net torque characteristics (curve G) of any form of propulsion. It is interesting to note in this respect that it has been necessary to resort to magnetic drags and similar schemes in order to retard the rate of movement of the ahead and astern lever to prevent loss of the holding power of the propeller. Therefore, any inherent characteristic which introduces a reasonable time element is decidedly desirable.

Curve D applies to the cross-compound turbine having a high-pressure element operating at 6000 revolutions per minute and a low-pressure element operating at 4500 revolutions per minute. When used with double-reduction gears to give propeller revolutions per minute of 80, calculations show that with full steam flow and a propeller characteristic like B the propeller can be brought to rest in 13 seconds and to 50 per cent revolutions per minute astern in 17 additional seconds from the time the steam is applied to the astern element.

Curve E would perform the operation more quickly.

In the case of curve F (tugboat Harry B. Williams) calculations made prior to building the equipment showed that reversal from full revolutions per minute ahead to full revolutions per minute astern could be made in 9 seconds. In actual service it is reported to have been done in approximately 6 seconds. It was not reported whether the propeller cavitated.

The reason the torque characteristics of curve D are lower than those of curve E is that the ahead element of the cross-compound turbine is much more efficient than that of the type of turbine represented by curve E, and hence less steam is available for backing.

In the case of curve H, which represents the characteristics of the 26,500-shaft horsepower twin-screw installation on the S.S. President Coolidge, reversal from 80 per cent ship speed ahead to 25 per cent propeller revolutions astern was accomplished in 25 seconds. It is evident that the synchronous motor system has ample characteristics for maneuvering, and that there is no longer any justification for using induction motors except in rare cases of special ships in which the induction motor is selected for other than torque characteristics.

The motor is synchronized at the point X and picks up the propeller curve. From the point the motor will develop full load torque without overload.

The point Y indicates the actual per cent revolutions per minute attained by a two-stage Curtis astern element in a cross-compound turbine installation when under full speed astern.

Although the curves show the full power or full load steam flow torque characteristics of the various types of equipment, it is necessary to use the full values only in rare instances. The machinery is capable of stopping and reversing much more quickly than is required of it in normal operation. The slower handling of the maneuvering operation is desirable in the interest of avoiding cavitation.

When reversing from astern to ahead rotation the torque characteristics are much better than when going from ahead to astern rotation and care should be taken to admit the steam more slowly.

The data in Table 1 have been supplied by some of the leading shipyards and naval architects from their trial records. It includes reversal data from a list of representative ships having various types of propelling machinery. The names of the ships are not given; however, it will be noted that all are merchant ships, where no particular effort is made to obtain quick reversals, except in the case of some of the turbine-electric ships.

The time required to stop the propeller varies considerably as does also the time required to reach full astern revolutions per minute. However the time to bring the various ships dead in the water does not differ materially except in a few instances.

There are not sufficient data on the time to reach full ship speed astern to draw a conclusion; however, what there is shows a fair uniformity.

An interesting comparison is that of the ratio of head reach to length of ship given in the last column. The range is from 2.5 to 10. The turbine ships generally show the largest ratio. This can be attributed to the fact that the controls are wheel operated instead of lever operated, with resulting greater time to admit full steam astern, and to the fact that for some reason the engineers are in the habit of handling the turbines too delicately. There is no particular reason why the throttle valves should not be lever operated in order to get quicker action.

The turbine-electric ships show a remarkably uniform ratio of 3.5 to 4.

The reciprocating engine ships (items 18 and 20) have the lowest ratios of 2.5 and 2.9. However, they are relatively low-speed, low-powered ships.

In respect to Table 1, it must be recognized that considerable data necessary for an intelligent and conclusive analysis are lacking. The performance depends also on such factors as the lines, draft, and hull resistance, and as stated previously no particular effort is usually made to obtain quick reversals during the trials of merchant ships. It is hoped that additional data will be submit-

(Page 48, please)

With the Society of *Naval Architects and Marine Engineers*

At the annual meeting of the Society of Naval Architects and Marine Engineers, held in New York November 18 and 19, a number of very interesting papers were read and discussed. We are here abstracting some of these papers for the convenience of our readers.

Composite Concrete and Timber Blocking for Dry Docks, by Commander E. C. Seibert, U. S. N. This paper describes the experience of the navy yard at Bremerton, Washington, in the use of composite blocking in their big dry dock. In 1928 it was necessary to replace certain blocks, and they found it practically impossible to procure water cured white oak suitable for this purpose. They then designed a composite concrete and timber block and placed a number of such blocks in service. The experience has been excellent. With few exceptions the blocks are still in excellent condition and good for many years to come.

The paper describes the mathematical and experimental analysis by which the author arrived at the relative compressibility of oak and of composition blocking for the purpose of setting the heights of mixed keel blocks under the ship. This experimental investigation disclosed some very interesting details as to the distribution of the ship's weight on the blocking. The author concludes that:

"The use of composite concrete and timber blocks has been attended with a high degree of success and economy. Their extensive future use is indicated.

"In a dock in which it is planned to use composite concrete and timber blocks, it will be highly advisable to provide for the use of some all-timber assemblies (for sliding bilge blocks) in conjunction with the composite blocks, as the tendency for the all-wood blocks to float makes for reduced resistance to sliding them in place. In a dock designed primarily for certain modern-type naval vessels, and for conditions now obtaining, roughly 15 per cent of the blocks might be sliding wood blocks.

"Since the bilge blocks and cribbing under certain modern ships have high load concentrations, investigation of the compressibilities of blocking would appear to be necessary, and the way pointed out in this paper may, it is hoped, be of value in this connection. While the

Table 1.—Technical Data on Coast Guard Cutters

Name	*Alexander Hamilton*	*316-Foot	*Itasca*	*Tampa*	*Northland*	*Manning*	*Algonquin*	*Tallapoosa*	*Hudson*
Class	C.C.	C.C.	C.C.	C.C.	C.C.	C.C.	C.C.	C.C.	H.C.
Built	1936	Proposed	1930	1921	1927	1898	1934	1915	1934
Length, overall	327'0"	316'0"	250'0"	240'0"	216'7"	205'6"	165'0"	165'6"	110'6"
Length, waterline	308'0"	295'0"	239'0"	220'0"	200'0"	188'0"	150'0"	150'0"	[illegible]1'6"
Beam, waterline	41'0"	46'6"	42'0"	39'0"	39'0"	32'10"	36'0"	32'0"	24'0"
Draft, mean (trial)	12'8"	16'0"	12'10 1/2"	13'2"	13'8"	12'3"	12'3"	11'9"	8'8"
Block coefficient	0.510	0.379	0.490	0.477	0.611	0.477	0.538	0.585	0.456
Midship coefficient	0.885	0.686	0.900	0.887	0.963	..	0.852	0.932	0.738
Prismatic coefficient	0.579	0.547	0.540	0.539	0.635	...	0.632	0.627	0.618
Displacement (trial)	2350	2350	1662	1506	1785	1000	1000	912	269
Speed (trial)	20 K	20 K	17 K	16.2 K	11.7 K	16 K	12.8 K	12 K	12.9 K
Propelling machinery	Geared-turbine	Geared-turbine	Turbo-electric	Turbo-electric	Diesel-electric	Triple-expansion	Geared-turbine	Triple-expansion	Diesel electric
Shaft horsepower (total-trial)	5250	5650	3350	2600	1025	2181	1500	1000	800
Propeller	3-blade twin	4-blade single	4-blade single	4-blade single	4-blade single	4-blade single	4-blade single	4-blade single	3-blade single
Diameter	9'0"	13'9"	11'9"	13'0"	10'0"	11'0"	10'8"	9'6"	7'6"
Pitch	10'1 3/4"	11'9"	11'6"	14'0"	13'3 1/2"	12'4"	10'4"	12'0"	6'5"
R.P.M. (trial)	241	173	163	130	132	152	140	115	250
Weights—Hull (tons)	1178	1528	952	842	1121	...	560	418	157
Machinery	414	340	323	275	316	...	162	223	82
Fuel	561	450	300	293	220	205†	156	172	12
Water	251	138	149	114	39	66	49	46	3
Equipment and supplies	156	108	153	114	192	52	74	54	15
Cost	$2,468,460	$1,500,000	$893,570	$775,000	$865,730	$175,960	$525,550	$225,000	$260,000

Table 1. (*Continued*).— Technical Data on Coast Guard Cutters

Name	*110-Foot	*Thetis*	*Active*	80-Foot	75-Foot	72-Foot	38-Foot	52-Foot	36-Foot
Class	H.C.	P.B.	P.B.	P.B.	P.B.	P.B.	PKT	M.L.B.	M.L.B.
Built	Proposed	1931	1927	1937	1925	1937	1936	1935	1936
Length, overall	110'3"	165'0"	125'0"	80'9"	74'11"	72'0"	38'0"	52'0"	36'8"
Length, waterline	105'10"	160'9"	120'0"	78'0"	74'2"	70'0"	37'0"	50'0"	35'0"
Beam, waterline	25'0"	23'9 1/4"	23'4"	14'7"	12'7 1/4"	12'9"	8'6 1/4"	12'8 1/4"	9'5 1/4"
Draft, mean (trial)	9'6"	7'8 1/2"	7' 1/2"	4'0"	3'7 1/2"	3'7"	3'0"	6'6 1/2"	3'3"
Block coefficient	0.437	0.378	0.334	0.458	0.428	0.449	0.483	0.419	0.524
Midship coefficient	0.759	0.660	0.734	0.722	0.710	0.613	0.7[illegible]	0.675	0.763
Prismatic coefficient	0.576	0.573	0.537	0.635	0.603	0.733	0.682	0.621	0.687
Displacement (trial)	310	334	232	51.7	34	31	7	31	11
Speed (trial)	12 K	16 K	11.6 K	30 SM	18 SM	35 SM	26 SM	11 SM	9.5 SM
Propelling machinery	Diesel-electric	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Gasoline	Diesel	Gasoline
Shaft horsepower (total-trial)	1000	1340	600	1680	400	1680	325	150	100
Propeller	3-blade single	3-blade twin	3-blade twin	3-blade twin	3-blade twin	3-blade twin	3-blade single	3-blade single	3-blade single
Diameter	8'0"	62"	42"	33"	28"	33"	23"	30"	28"
Pitch	5'6"	53"	30"	34"	21"	30"	22"	28"	16"
R.P.M. (trial)	260	450	700	1200	1200	1489	1630	673	1000
Weights—Hull (tons)	167	170	156	34.4	21.3	20.1	3.44	21.2	8.16
Machinery	91	88	33	9.3	5.7	7.0	1.47	4.9	1.21
Fuel	20	28	22	7.1	2.6	5.3	0.67	2.0	0.45
Water	5	17	6	1.1	0.8	...			
Equipment and supplies	27	31	32	4.7	3.6	1.3	1.34	2.2	0.80
Cost	$375,000	$208,850	$63,173	$51,975	$35,000	$43,965	$10,000	$70,000	$20,[illegible]

* Estimated. K—knots. SM—statute miles † Coal, others oil or gasoline

Table to illustrate paper on Coast Guard cutters.

data and computations presented may not attain a high degree of accuracy, it is felt that a degree appropriate to the problem has been achieved.

"It is important that composite blocking be so designed as to eliminate the possibility of disruptive forces from corroding (and, consequently, expanding) metal embedded in the concrete. Such items as metal inserts, nosings, dowels, corner guards and their fastenings, embedded in the concrete and projecting to or beyond the surface, are to be avoided."

U. S. Coast Guard Cutters, by Commander Frederick A. Hunnewell, U.S.C.G. This is a very interesting paper describing in considerable detail the history of the marine engineering and naval architectural improvements that have developed through the cutter building experience of the United States Coast Guard since 1842, when steam was first introduced into the cutters of this service.

Much of the technical data gathered during these 95 years of experience are compressed into the comments of the author, who is chief constructor for the service. The practical product of this experience is given in the table of technical data on Coast Guard cutters reproduced herewith.

Efficient Burning of Fuel Oil Afloat, by Lieut. John A. Hayes, U.S.N., Ret. The author reviews the factors connected with the design, installation, and operation of oil burners on board ship as these factors affect the efficient combustion of fuel oil:

"The requirements for efficient combustion are summarized as follows:

"(1) Selection of a satisfactory oil.

"(2) Heating to produce optimum viscosity.

"(3) Complete atomization of the oil.

"(4) Complete intermixture of air and oil.

"(5) High furnace temperature, good brick work, no furnace leaks.

"(6) Minimum excess air.

"(7) No flame impingement.

"(8) Proper selection of sprayer plates.

"(9) No casing leaks.

"(10) Clean boilers.

"(11) Careful adjustment of burners and registers."

Maneuvering Characteristics of Propellers and Propelling Machinery, by Walter E. Thau, Marine Department, Westinghouse Electric & Manufacturing Company. A very interesting paper in Mr. Thau's brief, terse style that is very difficult to abstract. We are publishing this paper in full on page 32 of this issue.

Ship Propulsion by Mercury Vapor Process, by Wm. L. R. Emmet. This paper makes public "certain new knowledge relating to the mercury vapor process invented by the writer years ago." The paper is confined to the possible application of "this process with oil fuel, as in ships." It is calculated that the mercury vapor process applied to the propulsion plant of the Normandie would reduce her fuel consumption by 38 per cent. If she averaged 130,000 horsepower, 28 knots, and made 20 round trips a year, this saving would mean $400,000 a year. There would also be a saving of 400,000 cubic feet in space required for propulsion machinery.

The fact that something over 1700 tons weight would be saved over the present machinery indicates that the mercury vapor machinery should cost less than the present steam plant. A new type of mercury boiler has been designed and built, and is in operation at Pittsfield under conditions essentially identical to those "aboard ship even in the heaviest weather." The arrangement of this boiler is shown herewith. It is apparently about 7 feet in diameter and about 23 feet high, and can generate 3000 horsepower at moderate pressures.

The condensation of the mercury vapor exhausted from the turbine will produce enough steam in a simple heat exchanger to run the auxiliary generating plant for lights and auxiliary power purposes.

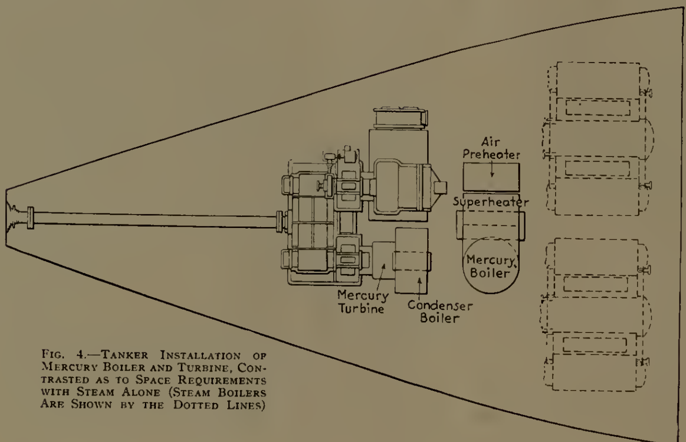
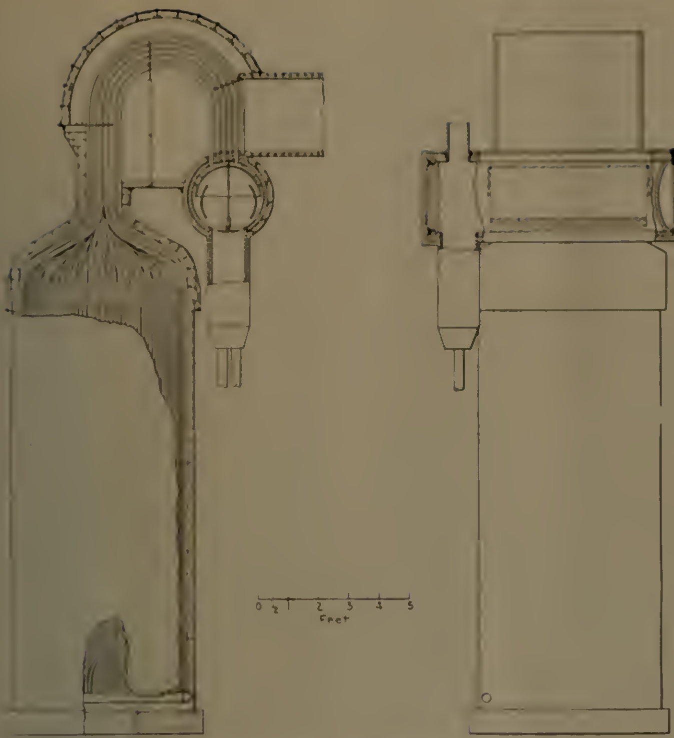


FIG. 4.—TANKER INSTALLATION OF MERCURY BOILER AND TURBINE, CONTRASTED AS TO SPACE REQUIREMENTS WITH STEAM ALONE (STEAM BOILERS ARE SHOWN BY THE DOTTED LINES)

Alloys in Shipbuilding, by Paul Ffield. The author of this paper is Materials Engineer at the Fore River Plant of the Bethlehem Shipbuilding Corporation Limited at Quincy, Mass. The paper considers in a very practical way the application of various alloys in the building of a ship and the effect that the processes of fabrication may have on the properties of these alloys, as well as the effects that the physical properties of alloys have on the entire operation of a shipyard fabricating plant.

An appendix to this paper is entitled, "A note on the possible magnitude of welding stresses," and covers quite comprehensively that very much debated question. We shall publish this paper in full in a forthcoming issue.

Design and Construction of Ship Interiors, by J. Philip Kiesecker. The author, a consulting architect of New York, has had considerable experience in the design and decoration of passenger accommodation on board ship. This paper gives a very sketchy account of the history of architectural treatment of ship interiors, and describes and illustrates some of the recent work of the au-



Sectional elevations of mercury boiler designed for marine service.

thor for the preservation of decorations in the "comfort with dignity" style while complying with the latest ideas of fireproof construction in passenger quarters.

Modern fire resistant and fireproof materials have greatly simplified the problem. The possibilities in these materials, together with the present vogue for flush, plain surfaces, dependent on color and proportion for pleasing effects, have completely revised the ideas of American ship decorators. The results are less costly maintenance, better sanitary conditions, better pleased passengers, and greater satisfaction all around.

The Mariners' Museum, by Homer L. Ferguson.

"During the latter part of 1929, Mr. Archer Milton Huntington, principal owner of the shipyard at Newport News, Virginia, decided to build near that place a Mariners' Museum 'devoted to the culture of the sea and its tributaries, its conquest by man, and its influence on civilization.'"

This introductory paragraph tells the story. Homer L. Ferguson is president of the shipyard at Newport News and also of the Mariners' Museum, which Mr. Huntington did build in right worthy fashion under a charter granted by the Commonwealth of Virginia on June 2, 1930.

Nearly 1000 acres of land embracing Waters Creek, a tidal estuary of the James River, five miles north of Newport News, were purchased and deeded to the Museum. A lake of 165 acres was formed by dam and named Lake Mawry, after the celebrated American oceanographer. Roads were built, old buildings razed, water mains laid, power lines installed, trees and shrubs planted, and the lake and park stocked with game. The entire area was made into a game sanctuary under the laws of Virginia.

A one story building of brick, steel, concrete, asbestos and glass, designed for indefinite extension, houses the exhibits. A model making shop is equipped to make models from the lines or drawings of ships and a considerable number have been made.

Figureheads, models of machinery and equipment, instruments, hand tools, sailor handiwork of all kinds, china, postage stamps, coins, medals, etc., are being accumulated so fast that the building has been enlarged twice to accommodate them.

There is also a fast growing library, now containing 18,000 items.

A substantial endowment assures long life to this institution.

The Mariners' Museum publishes monographs from time to time on various marine items of historical interest.

Fire Control for Passenger Vessels, by George C. Sharp. Four years ago George C. Sharp, a consulting naval architect of New York and chairman of the Sub Committee on Fire Control of the Sub Committee on Safety at Sea of the Senate Committee on Commerce, presented a paper on this same topic, which, in a very detailed way, covered the work on fire prevention and control that had been done up to that date. The present paper covers the work of the past four years. In tabular statement and in diagrammatic plans, the new rules for fire control are set forth in very complete detail and in compact form.

An appendix to the paper, much more voluminous than the paper itself, describes and illustrates the tests carried out by the Sub Committee on Fire Control, using the steamer Nantasket, which had been devoted to this purpose by the United States Shipping Board (now U. S. Maritime Commission) from its laid up fleet in the James River. The Shipping Board also provided an appropriation for carrying on the work. Bulkheads and partitions in various materials and methods of construction were built into this ship and tested by various types of fires, all under supervision and control of experts. The results are described and illustrated very completely.

This paper, then, is a record of four years of American activity in the effort to secure control of fire on shipboard. Together with the former paper, it is a complete reference work on the subject covered. The paper itself gives the present requirements. The appendix shows why those requirements were written into the rules.

Elements of Ship Subdivision

By Ross Laurenson

Asst. Naval Architect, Bureau of Marine Inspection and Navigation

The Bureau of Marine Inspection and Navigation during the last few years, has been engaged in a program to improve the subdivision characteristics of passenger vessels of the American merchant marine. To the expert such terms as "floodable length," "permeability," "criterion of service numeral," "factor of subdivision," and "permissible length" are quite familiar; but to many in both the shipbuilding and shipping industry these terms have but a vague meaning. It is felt that many would appreciate a general discussion of this subject giving a simple and understandable description of terms usually employed in matters relating to subdivision.

In such a brief article it is impossible to discuss any item in detail or to be too precise in the use of terms; hence when, for example, the term "bulkhead deck" is used instead of "margin line" it should be understood by those familiar with the subject that no inaccurate statement has been made. Moreover, it will be noted that no mention in this article has been made on the important subject of damaged stability. The statement that a vessel is one, two, or three compartment (to be explained later) may be meaningless unless due consideration has been given to the vessel's stability after damage.

The **floodable length** is that length of a portion of a vessel contained between transverse bulkheads which when flooded with water will trim and/or sink the vessel from its initial or intact water line to a floating condition at a water line which is just at the edge of the bulkhead deck (the deck to which all main transverse watertight bulkheads are carried).

Consider, as an example, a passenger and freight ship about 400 feet long floating at her deepest load draft. Somewhere in the forward part of the vessel let a good-sized hole be made in the ship's side; the inrushing water will immediately cause the vessel to settle by the head. If a transverse watertight bulkhead exists forward and aft of the hole, the water will naturally be confined to the space between the two bulkheads. Now, how far should the bulkheads be placed apart so that when the vessel has finally settled the new trimmed waterline will just touch the edge of the bulkhead deck? This distance is a matter of calculation, and when determined is called the **floodable length** for that particular portion of the vessel. In a similar manner the floodable lengths can be determined for other portions of the vessel. With these various floodable lengths known, a **curve of floodable lengths** can be drawn which will have a high point at amidship, will slope down to about quarter positions where it reaches low point, from which it increases to the end positions. If the reader will consult a typical floodable curve frequently shown in the technical press he will see that this is the case. The curve is usually like an ocean wave with the crest amidship and the troughs of the wave at about the quarter positions. Use is made of this curve and the permissible length curve (referred to later) to locate bulkheads in a new design or to check the bulkhead positions in an existing vessel in order to meet subdivision requirements.

When a weight is put aboard a ship the amount the vessel sinks in the water is dependent upon the amount of the weight. When a vessel is damaged so that water enters the hull the amount the vessel sinks is in the same way dependent upon the amount of water entering. The amount of water which enters a space in a vessel is in turn dependent upon the actual volume of the cargo, stores, machinery, furnishings, etc., which are contained within the space flooded. For this reason a curve of floodable lengths must be related to a definite value of **permeability** which is the percentage of that space which can be occupied by water. It is not usually practical to obtain values for the permeability for all conditions of loading, so formulas have been devised by which average values are obtained for machinery space, cargo spaces, passenger spaces, etc. The 1929 international convention on safety of life at sea prescribes formulas for determining the average permeability of the machinery space and the forward and after portions of the vessel. Floodable length curves are customarily drawn with respect to these average permeabilities.

The draft at which a vessel is floating before being damaged directly affects the floodable lengths of the vessel. This is due to the fact that the deeper the draft at which a vessel floats, the less the reserve buoyancy. For this reason every curve of floodable lengths is associated with a particular draft. For a given ship with bulkheads in place there is a draft at which the floodable lengths are just large enough to meet the subdivision requirements. This draft is called the **subdivision draft.**

If the bulkheads of a vessel are so arranged that any one compartment can be flooded without the bulkhead deck being submerged the vessel is called a "one-compartment vessel." If, however, the bulkheads of a vessel be so arranged that any adjacent two of the compartments can be flooded the vessel would then be a "two-compartment vessel." This can

be extended to obtain three-, four-, and even five-compartment ships.

The advantages of the higher degree of subdivision are that bulkheads themselves can be damaged without the vessel submerging the bulkhead deck, and that a greater freeboard will result after damage, with a corresponding greater chance for the survival of the vessel.

As bulkheads subdividing cargo holds may be a hindrance to the stowage of certain types of cargo, it is usually desirable from the operator's standpoint to limit the number to a minimum. Thus a compromise must be arrived at between safety and economy such that operators will continue to find the building and operation of ships a profitable enterprise. For this purpose, and in order that the operators of various nations will not be forced to meet the competition of less carefully supervised foreign vessels, subdivision requirements (as well as many other factors affecting safety at sea) are laid down in international conventions.

According to the 1929 convention, a ship is a passenger ship when she carries more than 12 passengers, and so far as subdivision is concerned the convention deals only with passenger ships.

As every passenger ship must be at least "one-compartment," one would expect that the type of vessel carrying a small number of passengers would be either one-compartment or better, and that for a given ship the subdivision would increase as the number of passengers increased. To take care of this situation the convention introduces such terms as **criterion of service numeral, factor of subdivision and permissible length.**

A **criterion of service numeral** represents in a general way the extent to which the ship is "a passenger vessel." Its value increases as the ship passes from a type engaged primarily in the carriage of cargo to a type engaged primarily in the carriage of passengers.

The **factor of subdivision** is defined in terms of the criterion of service numeral and depends on the length of the ship and for a given length varies according to the nature of the service for which the ship is intended. The **permissible lengths** are obtained by multiplying the floodable lengths by this factor. A curve of permissible lengths can then be drawn and from this curve the greatest allowable lengths of compartments are obtained.

While it is usually desirable to have all watertight subdivision bulkheads extending from keel to bulkhead deck in a single plane, occasions arise when at certain parts of the ship the arrangement of passenger accommodations, galleys, pantries, etc., would be improved if the bulkheads in question were stepped or recessed. The 1929 convention recognizes such cases and has laid down special rules to take care of the situation. These special rules also define the minimum length of compartments, the circumstance when the permissible length may be exceeded, etc. In some cases the rules make concessions; in others, restrictions.

The brief description here given has touched on the mere fringe of a somewhat complicated subject. However, it is believed that the explaining of some of the terms used in subdivision may be of assistance to those unfamiliar with the subject.

[From The Bulletin, Bureau of Marine Inspection and Navigation.]

Literature of the Industry

The Port of Boston, Massachusetts. A revised report compiled by the Board of Engineers for Rivers and Harbors, War Department, and the United States Maritime Commission, and issued as Port Series No. 2. Price 35 cents.

This revised volume gives information with regard to port and harbor conditions; port customs and regulations; services and charges; fuel and supplies; and the facilities available for service to commerce and shipping, including piers, wharves, grain elevators, storage warehouses, bulk freight storage, dry docks and marine railways, marine repair plants, floating equipment, and wrecking and salvage facilities. Railroad and steamship lines are discussed and information presented regarding their charges and practices in connection with terminal service. Tables are presented showing in detail the foreign and domestic water borne commerce at the port during the period 1926-35. Information is also given showing the origin of imports and the destination of exports, as well as the origin and destination of intercoastal traffic during the calendar year 1935.

Imo Oil Pumps, Series A-32 of the De Laval Steam Turbine Company, describes a rotary displacement pump intended primarily for fuel, lubricating and heavy crude oils. This pump, which is designed to run at conventional motor and turbine speeds, has only three moving parts, a central or power rotor and two idler or sealing rotors. The spindle of the power rotor is extended through a stuffing box for connection to the driving motor, but there is no other stuffing box; also no pilot gears, no bearings and no valve. All moving parts are in hydraulic balance axially and in rotational balance. Pumps of this type are built in all capacities and for pressures up to 500 lbs. Pumps for higher pressures can also be supplied.

Fig. 1. Union Oil dewaxing plant at Oleum. Valves and fittings by Crane.

Fabricating *Pipe*

Pipe Bending Methods in a West Coast Shop and Applications for the Intricate Demands of Plant Installations

There are many applications of pipe bends in different services aboard various classes of ships, both naval and mercantile. As the modern demands of larger powers, greater speeds, higher pressures and temperatures expand, the installation of piping becomes more important and as a rule more complicated. Particularly is this the case since the introduction of the welding of pipe and pipe fittings has enabled the marine engineer to design and install pipe systems aboard ship that are free from the limitations imposed by conventional fittings and joints. While these installations present no special problem, it is nevertheless true that the fabrication and installation of ship piping requires adequate equipment, handled by the most expert labor under skilled supervision.

The various illustrations accompanying this article are reproduced from photographs supplied by the San Francisco branch of Crane Co. of Chicago. These photos represent

Fig. 3. Crane San Francisco sales force. Truck equipment loaded with 21,000 lbs. fabricated pipe and fittings for delivery to Fibreboard Products, Inc., Stockton.

and Pipe Fittings for Industry's Varied Uses

Fig. 2. Union Oil dewaxing plant. View shows group of Crane valves and fittings.

various classes of pipe bends and other work typical of the projects regularly carried out in this interesting Pacific Coast plant. While the greater part of the activity in this company's local shops is new fabrication, there is naturally a certain amount of repair and maintenance work that comes in from all directions and which is accomplished with the same degree of care and skill as is applied in the preparation of entirely new work. This applies to all operations such as cutting, bending, threading, welding, flanging and other processes essential to satisfactory accomplishing of the wide range of work in this field, whether new or in the line of maintenance and repair.

The Crane Co. points out that its pipe bends are used for a variety of purposes, although principally to provide flexibility to compensate for the

(Page 56 please)

Fig. 4. Interior of pipe shop showing National seamless pipe—10 inch to 20 inch sizes—and Crane fittings fabricated in Crane San Francisco shops for boiler room of Fibreboard Products, Inc.

On the Ways—

SHIPS IN THE MAKING

LATEST NEWS FROM AMERICAN SHIPYARDS

Notable Pacific Coast Launching

At 12:15 p.m., November 20, U. S. torpedo boat destroyer No. 400 was christened U. S. S. McCall, and launched from the ways at the Potrero Works of the Union Plant of the Bethlehem Shipbuilding Corporation, San Francisco, California. (See cover illustration this issue.)

U. S. S. McCall is 334 feet long, is of 1500 tons displacement, and has a mean draft at that displacement of 9 feet 10¼ inches. Her keel was laid March 17, 1936. She is notable as being the first war vessel launched from a commercial shipyard in the bay district since the close of the hectic shipbuilding program connected with the European War.

She was named in honor of Lieutenant Edward Rutledge McCall, U. S. N., who distinguished himself in the engagement between the Enterprise and the Boxer in the war of 1812. During this engagement, the Captain of the Enterprise was mortally wounded, and when he died shortly after the Boxer surrendered, Lieutenant McCall succeeded to command and brought both vessels into port. For his part in this victory, McCall was awarded the gold medal by Congress.

Miss Eleanor Kempff, daughter of Rear Admiral Clarence S. Kempff, Commandant of the Mare Island Navy Yard and Commandant of the Twelfth Naval District, acted as sponsor of the McCall. Miss Kempff is the granddaughter of the late Rear Admiral Louis Kempff, U. S. Navy, and a "Selby" girl. She is the great granddaughter of Thomas H. Selby, founder of the Selby Smelting Works and twelfth mayor of San Francisco. On her mother's side she is the great granddaughter of William F. Babcock of San Francisco, and granddaughter of Dr. and Mrs. Charles B. Brigham, who resided in San Francisco.

Good progress is being made on the sister ship at the Union Plant, and she will be launched early next year.

Order Placed for New Liner

Late in October the U. S. Maritime Commission formerly placed an order with the Newport News Shipbuilding & Dry Dock Company for the express cabin class passenger liner which is to replace the Leviathan and be a running mate for the Washington and the Manhattan.

This order is on the bid of $15,750,000 adjusted price basis, which means that the final cost on hull and machinery may be adjusted to meet rising prices of labor and material up to an increase of 15 per cent of the total of those two items. The final cost may therefore be nearly 18 million dollars.

This vessel will be the largest and most costly commercial vessel ever built in an American shipyard. Her principal characteristics are:

Length overall	723 feet
Beam	92 feet
Depth, promenade deck	75 feet
Displacement on load draft	34,000 tons
Passenger capacity	1200
Crew personnel	630
Sea speed	22 knots

The propulsion machinery will consist of two sets of turbine gear located in one engine room. Each set will consist of a high pressure double reduction gear single flow turbine, an intermediate pressure single reduction gear single flow turbine, and a low pressure single reduction gear double flow turbine. A separate high pressure astern turbine will be connected through flexible coupling to the forward end of the intermediate pressure turbine, and will exhaust into the astern element in the low pressure casing.

Six express type boilers installed in two boiler rooms will furnish steam at 425 lbs. pressure and 700° F. temperature at superheater outlets. The ahead turbines are designed for a normal rating of 34,000 shaft horsepower at 128 r.p.m. on the propeller shaft, and the astern elements 19,500 shaft horsepower at 95 r.p.m.

The building differential granted by the Maritime Commission on this ship is 33-1/3 per cent of the bid price plus any rise in cost due to increase in labor and material prices. Contract calls for delivery in 852 days, which means approximately March 1, 1940.

Bethlehem Launches Standard Tanker

The Esso Baton Rouge, first of a group of four tankers to be built by Bethlehem Shipbuilding Corporation for Standard Oil Company of New Jersey, was launched at the Sparrows Point Shipyards on Saturday, November 13, at 1:00 p.m. Miss Mayme A. Hannaman, of Standard Oil Company's Baton Rouge office, was the sponsor.

The Esso Baton Rouge, the 315th vessel launched at Sparrows Point, and largest boat built in Baltimore since the World War, is constructed on the Bethlehem-Frear system of longitudinal framing and bulkhead design, and the customary arrangement for recent oil carriers has been followed, with machinery and crew's quarters aft and officers' accommodations and navigation spaces in a deck house admidships. The overall length is 463 ft., the molded breadth 64 ft., and the designed draft 28 ft. 4 in. It has a deadweight capacity of 13,000 tons and will carry a cargo of 106,400 barrels. The Esso Baton Rouge is designed for a speed of 13 knots, on 3500 shaft horsepower. Power for propulsion will be provided by a single screw installation of cross-compound turbine, designed and built by the Bethlehem organization.

A Large Job of Reconditioning

Remodeling of the Matson liner Malolo is now progressing at the Potrero Works of the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., at San Francisco. This job of face lifting and internal surgery on the famous liner is to cost over $300,000, and is the major job of its kind now in an American shipyard.

The principal item involves the raising of the lifeboats from B deck to the navigation bridge deck level. A deck will be extended on each side to allow for the installation on B deck of 20 additional first class staterooms, 16 of which will be of the de luxe lanai suite type that is so popular on the Hawaiian run. This change will cost $261,000.

Launching of the 18,500-ton tanker J. W. Van Dyke at the Sun Shipyards, Chester, Pa., on November 20, added to the American merchant marine the world's largest welded ship. Built for The Atlantic Refining Company, the giant oil carrier has a cargo capacity of 6,552,000 gallons. Her overall length is 541 feet five inches; her sea speed, 13.25 knots.

A Monthly Review of Tanker Markets

Williams, Dimond & Co.,
Oscar J. Beyfuss, Mgr.,
Chartering Department

San Francisco, November 15th

You will find in the list of fixtures below many lower rates, although you will see the Time Charter market is holding steady.

● **Time Charters**

Clean diesels were taken 8/- and 8/6 for three years and some for 8/3 for 18/20 months. One dirty motorship gets 11/- and another 8/6 for 18 months.

● **Voyage Charters**

AMERICAN: Gulf to North of Hatteras: Clean chartering was dull, the latest being 26½c for gasoline. A dirty tanker for heating oil was just closed at 27½c, while dirty charters are about 25c.

Intercoastal: Still no transactions reported.

FOREIGN: Gulf to U.K./Continent: Clean rates were fairly steady early in the month but are now down to 24/-. Dirty rates declined steadily from 24/6 to 20/-.

California to U.K./Continent: Several more clean fixtures have been made at 40/-

Black Sea to U.K./Continent: Clean rates were down to 23/6 and 22/- while dirty rates declined from 24/6 to 21/6.

Black Sea-Far East: No charters recorded.

California-Australia and New Zealand: No fixtures, but we note two clean boats from Bahrein to Australia at 49/-, Australian currency.

California - Far East: Numerous charters have again been made, nearly all for dirty tonnage, and many for consecutive voyages ranging from two to six trips. Rates have declined from about 30/- to 26/-, and even 24/- is reported done but not yet confirmed.

Building in American Yards

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
(Union Plant)
San Francisco

NEW CONSTRUCTION: **Hull 5355—McCall (DD400).** Launched November 20, 1937; completion date March 1, 1938. Hull 5356—Maury (DD401); completion date June 1, 1938. Two 1500-ton destroyers for U. S. Navy; length, 341′ 3⅝″; beam, 35′ 6⅛″; depth, 19′ 8″. Cost $3,675,000.

DRYDOCK AND ROUTINE REPAIRS: Gulf State, Corrales, Tulsagas, Stm. Sch. Caspar, Chiriqui, Lurline, Condor, Hawaiian, President Cleveland, Capac, M.S. Canada, M.S. Pacific Pioneer, Tug A. G. Wells, Washington, West Ira, M.S. Fosna, Talamanca, Brookings, Santa Elena, Ewa, Paul Shoup, M.S. Redline, Admiral Senn, M.S. Hauraki, Antigua, U.S.S. New Mexico, Tug Standard No. 1, District of Columbia, K. R. Kingsbury, Waiotapu, Anna Schafer, M.S. New Zealand, M.S. Roseville, M.S. E. F. Johnson, Malolo, President Taft, Santa Rosa.

GENERAL ENGINEERING & DRY DOCK CO.
Foot of Fifth Avenue
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Oregon, U. S. Cutter Golden Gate, Gas. S. Sun Maid, Idaho, Gas S. Sea Star, Gas. S. El Capitan, Tug Governor Markham, Oil S. Port Costa, Barges Nos. 16 and 17, Lumbertown, Lumberman, Noyo, Paul Shoup, Gas. S. Dependable, Barge No. 201, Tahoe, W. R. Chamberlin, Oil Barge 1923, Barges Nos. 52 and 54.

HARBOR BOAT BUILDING CO.
Berth 264—Fish Harbor
Terminal Island, Calif.

NEW CONSTRUCTION: **Four 80′ U. S. Coast Guard patrol boats;** 1,600 H.P. each; Liberty-Vimalert conversions; speed 30 m.p.h. Keels laid September, 1936; launching dates September 11, October 23, November 10 and 25; estimated completion dates October 4, November 6 and 24, and December 15, 1937.

HONOLULU IRON WORKS
Honolulu, T. H.

DRYDOCK AND ROUTINE REPAIRS: U.S.L.H.T. Kukui, Steel Mariner, Buffalo Bridge, U.S.A.T. Ludington

LAKE WASHINGTON SHIPYARDS
Houghton, Wash.

DRYDOCK AND ROUTINE REPAIRS: Lightship Umatilla, Lighthouse Tender Heather, Ferry Mt. Vernon, Yacht Westward, Yacht San Wan.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.
Los Angeles Harbor
San Pedro, Calif.

NEW CONSTRUCTION: **Hull No. 57,** one steel harbor barge 139′ x 40′ x 14′; 8,200 bbl. capacity; for General Petroleum Corp. of Calif. Delivery date, January, 1938.

DRYDOCK AND ROUTINE REPAIRS: W. T. Derrick Barge No. 4, Sch. Lottie Bennett, San Pedro Derrick Barge, W. T. Borax Barge No. 10, W. T. Camera Barge, Golden Peak, M.V. Capella, Golden Star, Topila, Argyll, Santa Maria, M.V. Sendai Maru, Westward Ho Maru.

MARE ISLAND NAVY YARD
Mare Island, Calif.

NEW CONSTRUCTION:

Pompano (SS181) submarine; keel laid January 14, 1936; launched March 11, 1937; estimated delivery date November, 1937.

Sturgeon, Submarine (SS187); keel laid October 27, 1936; estimated delivery September, 1938.

Swordfish, Submarine (SS193); keel laid October 27, 1937; estimated delivery date August 1, 1939.

Order received for construction of two harbor tugs October 7, 1937.

DRYDOCK AND ROUTINE REPAIRS: New Orleans, Indianapolis, Trenton, Richmond, Milwaukee, Altair, California State, Ortolan, Vega, Oglala, Porpoise.

THE MOORE DRY DOCK CO.
Oakland, Calif.

DRYDOCK AND ROUTINE REPAIRS: Golden Horn, K. I. Luckenbach, Patterson, Frances, Water Barge No. 30, West Mahwah, M. H. Whittier, Aradne, Mexican, A. Mackenzie, Edna Christenson, Golden Hind, Fort Armstrong, Jane Christenson, Alaska Standard, Pacific Pioneer, K. R. Kingsbury, Lena Luckenbach, Richmond, Golden Gate (cutter), Hindes, Wildwood, West Carmargo, Ketchikan, Purse Seiner New Deal, Purse Seiner Sunde, Brasil, Purse Seiner Jeannette, Daphne (patrol boat), Standard No. 1, Purse Seiner Infallible, Silver Willow, Nordanger, Purse Seiner Endeavor, Silverbeech, Julia Luckenbach, Purse Seiner Midnight Sun, Transport St. Mihiel, Carolinian, Purse Seiner St. Anthony, Purse Seiner El Padre, Purse Seiner Western Pilot, Elizabeth, Zaca, Barge 18, Barge 19, Samoan, Paul Shoup, H. T. Harper, Purse Seiner American Rose, Purse Seiner Anadir, Alabaman, Purse Seiner Pacific Fisher, Nebraskan, Silverguava, Siantar, E. P. Ripley, Brunswick, Santa Monica.

THE PUGET SOUND NAVY YARD
Bremerton, Washington

NEW CONSTRUCTION: **U.S.S. Patterson** (Destroyer No. 392); standard displacement, 1500 tons; keel laid July 22, 1935; launched May 6, 1937; commissioned September 22, 1937; completed November 1, 1937.

U.S.S. Jarvis (Destroyer No. 393); standard displacement, 1500 tons; keel laid August 21, 1935; launched May 6, 1937; commissioned October 27, 1937; estimated completion date December 1, 1937.

U.S.S. Wilson (Destroyer No. 408); standard displacement, 1500 tons; keel laid March 22, 1937.

DRYDOCK AND ROUTINE REPAIRS: Lexington, Maryland, Ranger, Northampton, John C. Spencer.

TODD SEATTLE DRY DOCKS, INC.
Harbor Island
Seattle, Wash.

DRYDOCK AND ROUTINE REPAIRS: Point Brava, Forbes Hauptman, M. S. Fella, Anniston City, Lillian Luckenbach, Jacob Luckenbach, Pacific Hemlock, Pacific Pine, Point Salinas, Depere.

WESTERN BOAT BUILDING CO., INC.
2505 East 11th Street
Tacoma, Wash.

NEW CONSTRUCTION:

Hull No. 130, purse seine fishing vessel 81 x 20 x 9.5 ft.; powered by 200 H.P. Atlas 6 cylinder diesel. Keel laid October 10, 1937.

DRYDOCK AND ROUTINE RE-

PAIRS: Passenger steamer Virginia V; fishing boats Marconia and Valencia.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Pennsylvania

NEW CONSTRUCTION:

One floating machine shop for C. C. Hunley, Cairo, Ill.; 82' x 20' x 3½'.

THE AMERICAN SHIP BUILDING COMPANY
Cleveland, Ohio

NEW CONSTRUCTION: **Two bulk lake freighters** 610' x 60' x 32' 6"; 2,000 I.H.P. geared turbine, water tube boilers, 400 lbs. pressure, electric auxiliaries; for Pittsburgh Steamship Company. Keels laid June 21, 1937; and July 6, 1937; launching dates November 10 and December 2, 1937; delivery date April 15, 1938.

BATH IRON WORKS
Bath, Maine

NEW CONSTRUCTION: Hulls Nos. 161, 162, and 163; **DD394 Sampson, DD395 Davis** and **DD396 Jouett**; Three 1850-ton destroyers for U.S. Navy; date of contract September 19, 1935. Estimated delivery dates June, August and October, 1938, respectively; launching dates indefinite; DD396, keel laid, Mar. 26, 1936. DD395, keel laid July 28, 1936. DD394, keel laid April 8, 1936.

Hulls Nos. 170-171, DD409, Sims, and DD410, Hughes, two 1500-ton destroyers for U. S. Navy; contract date October 12, 1936; keels laid July 15 and September 15, 1937, respectively; launching dates, indefinite; delivery dates April, 1939, and June, 1939, respectively.

Hull No. 176, Villanova, single screw, diesel propelled trawler for Boston, Mass., owners; delivered November 1, 1937.

Hulls Nos. 177 and 178, DD423 and DD424, two 1620 ton destroyers for U. S. Navy. Contract date September 30, 1937; delivery dates April and June, 1940, respectively.

BETHLEHEM SHIPBUILDING CORPORATION
Fore River Plant,
Quincy, Mass.

NEW CONSTRUCTION:

CV7, Wasp, Airplane Carrier for U.S. Government; keel laid April 1, 1936; estimated delivery, September, 1938.

Hull 1463, U. S. Army Hopper Dredge Goethals; 5000 cubic yards capacity; keel laid October 5, 1936; launched August, 1937; estimated delivery, February, 1938.

Yale; diesel drive trawler for General Sea Foods; keel laid June 17, 1937; launched September 23, 1937; delivered November, 1937.

Three passenger and freight steamers for Panama Railroad S.S. Co.; 486 feet x 64 feet x 38 feet 6 inches; 16½ knot speed.

BETHLEHEM SHIPBUILDING CORPORATION
Sparrows Point Plant
Sparrows Point, Md.

NEW CONSTRUCTION: **Two oil tankers**—steam—425'x64'x34' for Gulf Oil Corp.; total tonnage 7070 each; estimated launching, first ship, October 9, 1937.

Four 13,000 deadweight ton steam turbine driven tankers for Standard Oil Co. of N. J.; length 442', beam 64', depth 34' 10", gross tonnage 7,600, speed 12 knots.

One tanker for Texas Co.; about 13,000 deadweight tons; steam turbine.

BOSTON NAVY YARD
Boston, Mass.

NEW CONSTRUCTION:

DD389, Mugford, and DD390, Ralph Talbot, two light destroyers; LBP 334'; beam 35'6"; depth 19'8"; keels laid October 28, 1935; launched October 31, 1936; delivery dates November and December, 1937, respectively.

DD402, Mayrant, and DD403, Trippe, two light destroyers for United States Navy; LPB 334'; beam 35'6"; depth 19' 8"; keels laid April 15, 1937; estimated delivery dates August, 1939 and October, 1939, respectively.

DD415, O'Brien, and DD416, Walke, two destroyers; LBP 341', beam 36', depth 19'8"; delivery dates indefinite.

DD425 and DD426, two destroyers; 341'0" x 36'0" x 19'8".

One harbor tug for U. S. Navy; 98'0" LBP x 24'0" x 13'6"; delivery date 1938.

BROOKLYN NAVY YARD
Brooklyn, N.Y.

NEW CONSTRUCTION:

CL 40, **Brooklyn**, light cruiser, L.B.P. 600'; beam 61'8"; standard displacement, 10,000; geared turbine engines; express type boilers; keel laid, March 12, 1935; launched November 30, 1936; estimated delivery, December 1, 1937.

CL 48, **Honolulu**, light cruiser; L.B.P. 600'; beam 61'8"; standard displacement 10,000; geared turbine engines; express type boilers; keel laid September 10, 1935; launched August 26, 1937; estimated delivery, May 1, 1938.

CL 50, **Helena**, light cruiser; L.B.P 600'; beam 61'7¾"; standard displacement 10,000; geared turbine engines; express type boilers; keel laying, December 9, 1936; launching indefinite; contract delivery, May 16, 1939.

CHARLESTON, S. C., NAVY YARD
Charleston, S.C.

NEW CONSTRUCTION:

Order placed for one **harbor tug**; LOA 124' 9", length between perpendiculars 117', breadth, molded, 28', depth, molded, 16'; keel laid August 2, 1937.

Order placed for one **harbor tug**; LOA 110' 3"; LBP 98' 0"; breadth 24' 0"; depth at side amidships 13' 6". No dates set.

Order placed for one **harbor tug**; 65 feet long.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

NEW CONSTRUCTION:

One diesel yacht, powered by 1,000 h.p. Winton engines; 143' long, 23' beam; steel construction. For Cox and Stevens, New York, N.Y. Delivery date May 1, 1938.

THE DRAVO CONTRACTING CO.
Engineering Works Dept.,
Pittsburgh, Pa., and Wilmington, Del.

NEW CONSTRUCTION:

Hulls Nos 1326-1327; two welded flush deck cargo box barges 100'x26' x6'6"; 320 gross tons.

Hull No. 1386; one single screw diesel towboat; for stock; 160 gross tons

Hulls Nos. 1413-1414; two welded steel towboat hulls for National Shipping Company; 600 gross tons.

Hulls Nos. 1427-1428, inclusive; two welded steel covered lighters 110' x 33' x 9' 6"; for Reading Co., Philadelphia, Pa.; 1120 gross tons.

Hull No. 1430; one welded steel barge 255' x 40' x 14'; for Kieckhefer Container Corp; 1600 gross tons.

Hulls Nos. 1431-1434; four welded oil barges 195' x 35' x 9' 6"; for stock; 1956 gross tons.

Hulls Nos. 1435-1439; five type W-4 welded steel coal barges 175' x 26' x 10'8"; for stock; 2360 gross tons.

Hulls Nos. 1440-1444; five type W-4 welded steel coal barges 175' x 26' x 10'8"; for stock; 2360 gross tons.

This makes a total of 22 hulls with a total gross tonnage of 10,486 tons.

ELECTRIC BOAT CORP.
Groton, Conn.

NEW CONSTRUCTION:

Hull No. 26, Salmon, SS182, standard displacement 1450 tons; keel laid April 15, 1936; launching date June 12, 1937; delivery date, January, 1938.

Hull No. 27, Seal, SS183, standard displacement, 1450 tons; keel laid May 25, 1936 launched August 25, 1937; delivery date, March, 1938.

Hull No. 28, Skipjack, SS184, standard displacement, 1450 tons; keel laid July 22, 1936; launching date October 23, 1937; delivery date June, 1938.

Hull No. 29, Sargo (SS188); keel laid May 12, 1937; delivery date June, 1939.

Hull No. 30, Saury (SS189); keel laid June 28, 1937; delivery date July, 1939.

Hull No. 31, Spearfish (SS190); keel laying date September 9, 1937; delivery date September, 1939.

Hull No. 33, Seadragon (SS194); 1450 tons; delivery date December, 1939.

Hull No. 34, Sealion (SS195); 1450 tons; delivery date February 1940.

THE FEDERAL SHIPBUILDING AND DRYDOCK COMPANY
Kearny, N. J.

NEW CONSTRUCTION:

Two destroyers, DD381 Somers and DD383 Warrington; 1850 tons; keels

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Government Aid in Preventing Injuries

(Continued from Page 25)

have gained the impression that the industry would not welcome statutory regulation of its operations for the purpose of bringing about greater safety in such employments. But what other alternative is there if the voluntary method fails? It would seem unfortunate to reject the latter without a fair trial, and frankly I do not believe it has been fairly tried. As I have pointed out, this voluntary method has proved effective wherever a genuine attempt has been made to apply it to individual ports. It has proven equally suitable for a sectional safety program, and there appears to be no good reason why it could not be made to operate effectively upon a national scale, provided the industry actually wants it to operate.

● **Cooperation or Compulsion?**

The development of this voluntary method will continue to have the practical assistance of the U. S. Employees' Compensation Commission. Careful studies of the causes of accidents comprise, of course, one of the first essentials in devising plans for preventing them. These studies have been made regularly by the Commission and they may now be compiled to cover nine years' experience under the Longshoremen and Harbor Workers' Act, and will be made available to the industry. The Commission is also conducting investigations of all fatal injuries as they occur, and special reports of such cases will be made available from month to month. The operations of employers with poor safety records will be studied with a view of urging such employers to adopt safer working practices.

During the past year the Commission began the publication of a monthly safety bulletin to be utilized as far as practicable for the promotion of safety in this employment. The facilities of this publication are available to all employers within the purview of the Longshoremen and Harbor Workers' Act and your suggestions as to how it can be used to the best advantage in promoting safer practices are earnestly requested. The Commission will assist further in the formation of additional local, state, and regional committees for this industry, and will supply to such committees available material relating to the cause of injuries and suggestions for preventing them. The Commission can and will do these things and will aid in such other ways as may be proper to help the industry prevent accidents by voluntary regulation.

However, more than this is necessary to insure a fair trial of voluntary safety code enforcement. Coordination of the work and cooperation on a national scale are essential. The Commission has encouraged this for some time, but with little success, due to the apathy of important sections of the industry. There should be a national safety code for stevedoring operations that will at least provide minimum standard requirements of safety for this employment, and there should be appropriate facilities for the voluntary enforcement of this code. It is not my purpose at this time to discuss the provisions of a code of this kind or the manner of its enforcement. These may be worked out with comparatively little difficulty if the industry will evidence a real desire to make this voluntary plan operate successfully.

● **Compulsion More Costly**

The second method by which the Government may aid in preventing injuries in this employment is the compulsory system. The Federal Government may by law provide for the safety of workers in this industry and prescribe penalties for failure to conform to such standards as may be established. A safety law of this kind might take one of two forms. It might be in the form of a statutory code of safety regulations, or it might confer upon a Federal administrative agency authority to prescribe an administrative code, which, when promulgated, would have the full force and effect of law.

Such a compulsory system would undoubtedly make it possible to eliminate unsafe working practices, but it would be more costly to the industry than voluntary regulation. It would necessarily entail considerable expense for administration, which in my opinion should properly be charged against the industry. The enforcement of a compulsory code, either statutory or administrative, would present certain complex administrative problems, particularly in connection with the servicing of vessels of foreign registry. Among some groups in the industry there apparently is considerable sentiment in favor of the compulsory system for the prevention of accidents; but I cannot escape the feeling that the industry as a whole is unsympathetic to it. However, compulsory safety regulation appears to be the only alternative in the event the industry fails to make a serious and determined effort on a cooperative basis to make voluntary safety regulation effective.

● **National Safety Code Needed**

Something must be done to reduce the number of accidents in employments under the Longshoremen and Harbor Workers' Compensation Act. The employers whose operations are affected by this act have the opportunity of demonstrating whether industry is able and willing voluntarily to put into effect practices which all thinking people recognize as essential and which, if not adopted voluntarily, may be made compulsory by law. If the Marine Section of this Safety Congress believes that effective accident prevention in longshore and harbor work can be accomplished by voluntary regulation, it can render a distinct service in the cause of safety by appropriate expression of its view on this subject. If this Section will consider the matter, I respectfully urge that its deliberations cover the advantages as well as the practicability of having a national committee representing the industry work out the details necessary for the preparation and enforcement of a national safety code. The Commission will be glad to accept membership on a committee of this kind, and I give you positive assurance that it will assist the committee, so far as possible, in the development of such a program of this kind.

The Care of Wire Rope at Sea

On a recent visit to a Pacific Ocean steamer we were shocked to see the condition of the wire ropes on the winches' drums. We knew that this rope was wound on these drums new and spotless just four months back, and yet here it was covered with rust spots and with no indications of lubricant in its strands. This indicated a maintenance problem the neglect of which causes in the aggregate tremendous annual costs. For efficiency of operation, for safety, and for long life in service it is just as necessary to properly lubricate wire rope as it is to lubricate the bearings of the winch.

Coming back to the office from this visit we found on the desk the latest copy of "Lubrication," that excellent monthly published by The Texas Company of New York. In this copy the lead article deals with "Cold Weather Lubrication," and so has much to say about the lubrication of heavy industrial machinery used out of doors. The section of this article dealing with "Wire Rope Protection" is very pertinent to those having the care of wire rope on shipboard, and we reproduce it herewith.

● Protection by Lubrication.

The ultimate efficiency of any materials hoisting operation is largely dependent upon the condition of the cables or wire ropes which carry the loads. Wire rope lubrication is therefore one of the most important factors in any such plant. The primary purpose of lubrication is to prevent rusting of the strands and to retard wear by reducing friction as far as possible. Obviously a rope with one or two broken strands due to rusting or wear traceable to improper lubrication may not only cause a tie-up of the entire machine if such strands interfere with the operation of sheaves, or other companion cables, but may also present a distinct hazard. Any wire rope in such condition is just that much weaker and less capable of handling the imposed loads.

Friction and wear are continually occurring between the strands of any wire rope. There is also a tendency to squeeze out any contained lubricant, especially when the ropes pass over sheaves or around drums. The renewal of this product is, therefore, an absolute necessity regardless of how effectively the core may have been saturated with lubricant by the manufacturers.

There is but little difference between friction as it occurs between the strands of a wire rope and friction between a bearing and shaft. Overheating and abnormal wear will practically always result, to reduce the load-carrying capacity and increase the amount of power consumed in operation. This can only be overcome by effective lubrication, brought about by the proper application of a suitably prepared wire rope compound, which will be capable of not only penetrating to the innermost strands and core of the rope, but also sufficiently adhesive and viscous to resist being prematurely squeezed out or washed off by the elements.

Such a lubricant must also resist any tendency to cake, gum or ball up, especially if contaminated with an excess of dust, dirt or metallic particles. Furthermore, it must not thin down to an excess when exposed to high temperatures. This, of course, directly involves the viscosity or relative fluidity of the product. In fact, viscosity of such products is the essential characteristic involved in purchasing. It should not, however, be assumed as being the chief guide as to the actual suitability of a wire rope lubricant. In this regard the ability of the latter to function, penetrate and stick under actual operating conditions is of outstanding importance.

According to the operating temperatures that may be involved, and the possibility of the presence of an excess of water, the viscosity of a wire rope lubricant should range from 500 to 1000 seconds Saybolt at 210 degrees Fahr. In service adjacent to ovens, furnaces or open hearths, etc., where there might be possibility of such a product thinning down to the extent of dripping off to perhaps result in lack of lubrication, it will be advisable to regard the maximum temperature prevailing as the criterion in selecting the lubricant. The same holds true for continued cold weather operation. Here, in service on the North Atlantic, the North Pacific or the Arctic, it will normally be advisable to use a lubricant of around 500 seconds viscosity in the interest of ease of application and

to assure of adequate ductility and resistance to cracking or chipping.

Wire rope lubricants to meet the aforesaid requirements should, in general, be straight mineral petroleum products, devoid of fillers or thickening medium. In other words, whatever the viscosity, it should be an inherent property of the lubricant, not an artificial characteristic which might be affected by temperature change or contamination.

For this reason greases or soap-thickened mineral oils are relatively unsuited to wire rope lubrication. To attain the requisite body a comparatively high percentage of soap would be necessary. Soap, of course, serves as the carrying medium for the oil. It has relatively no lubricating value; as a result, this property in the resultant product is decreased to a marked extent. Furthermore, the adhesive characteristic may be too low. In consequence, such products will not, in general, meet the requirements of wire rope lubrication especially under conditions of exposure or wide temperature change.

● Application of Lubricants

Heavy wire rope lubricants can best be applied in heated condition. This will reduce the viscosity temporarily and facilitate handling in some form of automatic lubricator. To merely attempt to daub or paint a rope with such a product at normal temperatures would be relatively difficult.

Even though the surface might be more or less coated, the possibility of penetration occurring to any extent would be remote. For this reason some authorities prefer to use a lighter bodied lubricant and to apply it more frequently..

Penetration is the secret of proper wire rope lubrication. Where it is effectively brought about, the wear between the internal strands will be markedly retarded. It is this latter which is so definitely related to rope life. Furthermore, if adequate penetration is attained, protection of the external surfaces will be automatically assured.

Exposed wire rope such as found on cargo winches, boat winches, and dock winches and cranes can be effectively lubricated by using a form of split box through which the rope can be run. Such a box can readily be built in the average plant, with suitable provision for rendering it sufficiently tight to prevent the lubricant from leaking out, even when reduced in viscosity by heating. The slow passage of the rope through such a bath of heated compound will insure that not only will the surface be coated, but also that the requisite penetration takes place to the inner strands. Further working of the rope over the sheaves before the lubricant has time to cool entirely will tend to aid in bringing about the maximum of penetration even to the extent of re-saturation of the core.

Propelling Machinery

(Continued from Page 34)

ted by the discussions in order to shed more light on this subject. It would be particularly interesting to have the results of tests in which efforts were made to stop the ships quickly.

To avoid high temperatures in the blading of the ahead element due to friction losses when operating for long periods astern, it is desirable to maintain a good vacuum; if this is done, there need be no concern.

During a test of a cross compound turbine operating in the astern direction at 80 per cent of the full load ahead revolutions, and developing 60 per cent of the full ahead power, the inlet temperature was 660 degrees F. and the vacuum 28.48 inches. At the end of one hour the temperature of the ahead stationary blading reached 502 degrees F. An extension of the curve indicates that a constant temperature of approximately 525 degrees F. would have been reached in two hours. A test made on the same turbine with 27.14 inches vacuum indicated a temperature of 650 degrees F. after one hour under the same load and steam temperature conditions.

Running Lights of Pacific Shipping

● **New President**

John E. Cushing makes our spotlight position this month! Upon elevation of Roger D. Lapham to Chairman of the Board, former executive vice president Cushing is appointed president of American-Hawaiian Steamship Co. Headquarters of both executives remain in San Francisco. Long recognized as outstanding shipping leader. A Stanford grad . . . born in Marvelous Marin . . . broad experience with major San Francisco operators.

Oil Transporter ●

William Groundwater, director of transportation, Union Oil Company . . . a distinctive figure in national marine circles, he was recently chosen president of Pacific American Tankship Association. Headquartered in Los Angeles, he is a frequent visitor to Bay area, where his company's tankers carry the crude to Oleum.

● **Shipbuilding Engineer**

Frank Fox, general superintendent of the shops of General Engineering & Dry Dock Co. "15 years with George Armes!" A real Georgia cracker. Member Olympic Club . . . but too busy for golf. Peninsula commuter, he has an attractive home 30 minutes away from Sansome Street. Keen, alert, regular fellow . . . he has hosts of friends in marine-industrial circles.

Shipowners Association Leader ●

Ralph W. Myers, president of Shipowners Association of Pacific Coast. Migrated from his native Oregon when 4 years old. For 33 years with steam schooner operators Hobbs-Wall. Dynamic — energetic — he has served many organizations as president, . . . Purchasing Agents . . . Propeller Club of California . . . past master F. & A. M. (Charter Rock, Berkeley, 1916). A Key commuter to beautiful Claremont. Purser Sutton Myers of Matson liner Monterey calls him "dad"! And there's a daughter. Who has more friends than Ralph Myers? Not even Jim Farley!

● **Cargoes**

Ramond F. Burley, freight traffic manager McCormick Steamship Company. Under the circle M houseflag for 16 years . . . three years previously with Parr-McCormick. Authority on foreign trade. Self-described "World's greatest baseball fan"! His library on the national sport probably most exhaustive extant. Born in Hayward (across the bay). Lives in San Francisco. Plays Sunday soft ball with his 12-year-old daughter.

Commodore ●

Captain Charles A. Berndtson, master of the Lurline. Matson has just conferred the rank of Commodore upon him . . . hoisting the "white star on blue field" to the foremast of his command on November 12, 1937. Boy and man, a true sailor. To sea at 14 as deck boy on a Norwegian bark. Joined Matson as quartermaster of the old Manoa. Received honors for Atlantic transport service in World War . . . was youngest Lieutenant Commander in U. S. N. R. Has skippered 10 different Matson ships during 21 years with the company. The Lurline has known no other master.

Propeller Club of California Enjoys 8th Annual Banquet

The Terrace Ballroom of the Fairmont was bulged to capacity on Saturday night, December 4, with jovial, fun-seeking Propellers and their friends.

It was a grand affair . . . as these events always are, and always will be.

Yes—we were there! Matter of fact, we're penning these lines the morning after . . . and with a clear head, too. We might deserve a bit of credit for this Sunday morning review—for we wanted you to have the story in this December issue.

The hospitality was superb . . . thanks to a thoughtful steward's department which might qualify for cards in any "good mixers" local.

The banquet was altogether Simpsonian . . . "fit for a king" is what we mean!

Then came the Show of Shows which made Bryant O'Connor's stock as an impresario soar above that of the famous Billy Rose.

And a grand audience it was! Discerning—applauding good voices . . . even sopranos. Novelty acts (we liked the colored trio!), a line of gals, the Scotch piper and the dancing lassies . . . good variety . . . lively tempo . . .

Then came the sublime moment of the evening. President Edward H. Harms, concluding his fine administration of 1937, was honored with a handsome ship's clock . . . the dial encompassed by a cleverly wrought ship's steering wheel . . . the "bells" a melodious "ding-dong" that will always remind him of his Propeller shipmates. Vice president C. E. "Dad" Le Count made the streamlined presentation speech. President Eddie was genuinely delighted . . . taken off his sea legs, so to speak—and told us in his best forensic tones that his bride of 60 days would be just as pleased as he with the beautiful gift.

Below: A condensed version of the jumbo telegram which summoned every available P. C. member aboard for annual Christmas fun-fest.

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable sign above or preceding the address.

WESTERN UNION

R. B. WHITE, PRESIDENT — NEWCOMB CARLTON, CHAIRMAN OF THE BOARD — J. C. WILLEVER, FIRST VICE-PRESIDENT

SIGNS
DL = Day Letter
NM = Night Message
NL = Night Letter
LC = Deferred Cable
NLT = Cable Night Letter
Ship Radiogram

The filing time as shown in the date line on full-rate telegrams and day letters, and the time of receipt at destination as shown on all messages, is STANDARD TIME.

[FACSIMILE]

FR56 69 DL=SANFRANCISCO CALIF12 153P

ALL MEMBERS.

PROPELLER CLUB OF CALIFORNIA

HOME PORT SANFRANCISCO=

IMPERATIVE YOU ATTEND TO ANSWER SHIPS MUSTER AT EIGHTH ANNUAL CHRISTMAS JINKS FAIRMONT HOTEL TERRACE BALLROOM SATURDAY EVENING DECEMBER FOURTH AT SEVEN OCLOCK SHARP STOP STEWARDS DEPARTMENT HAVE PREPARED AN EXCEPTIONALLY FINE MENU STOP FUN DEPARTMENT REPORTS ENTERTAINMENT WILL FAR SURPASS ALL PREVIOUS EFFORTS STOP YOU MAY BRING GUESTS STOP FIRST CLASS FARE FIVE DOLLARS RESERVATION BY CARD ENCLOSED STOP MAIL YOURS TODAY AND APPEAR AT GANGWAY STRICTLY INFORMAL=

ED HARMS MASTER.

WESTERN UNION TOURATE TELEGRAMS COST ONLY 35c. ANYWHERE

We might tell you about our homeward voyages . . . how Ralph Myers followed the white line over the bridge with a fog-piercing eye . . . how Harry Haviside arranged for personal transportation for all of his guests . . . how the East Bay contingency ganged up on Bern De Rochie's Buick . . . and the Peninsula "chapter" commandeered Ed Martin's sedan . . . but why steal their thunder?

A fitting climax to a swell year—this 8th Annual Christmas Banquet and Jinks!

Hope you were aboard!!

● Luncheon Meetings

Bethlehem's truly excellent film, "The Manufacture of Steel Sheets," was projected at the November 9 meeting. The scope — From Ore to Finished Product — proved exceptionally interesting to Propellers in attendance. Chairman of the day was Fred McLean, general superintendent of Bethlehem's Alameda plant.

● November 23

"The Part we can Play in the Added Developments of San Francisco Harbor" was the topic of guest speaker J. W. Howell, president of the S. F. Chamber of Commerce, on this date.

Speaker Howell had a real message for us which he presented forcefully — effectively. The problems with which his organization is confronted are singularly our problems, especially when the port's welfare is concerned. Mr. Howell is doing a great job for San Francisco, and we dare say many skeptics are being converted to the good work which the Chamber is achieving under his leadership.

Named Chairman of the Day, Fred M. Rohrer, Assistant Pacific Coast Manager of Grace Line, was unable to attend at the final hour. President Harms pinch-hitted very adequately.

Matson Commodore Takes Command

For but the third time in the history of the Matson Navigation Company, the rank of Commodore has been conferred upon one of the Company's masters. Captain Charles A. Berndtson, master of the Lurline, on November 12 assumed the responsibilities and honors that in times past have been held only by Commodore Peter Johnson and Commodore J. H. Trask, both now retired.

The hoisting of the Commodore's Flag—blue field with a star of white—took place aboard the S.S. Lurline one hour prior to the noon sailing of that vessel on her 100th voyage, Friday, November 12, 1937.

The ceremony, itself, was a remarkably simple one. On the highest deck of the liner forward, with company executives, officials and a few guests about, two quartermasters hauled away on a new halyard until the closewrapped flag was at the masthead. At two minutes after 11 o'clock, a sharp snap broke the lashings clear and the Commodore's Flag was on the breeze.

William P. Roth, president of the Matson Navigation Company, and others present, offered Commodore Berndtson congratulations. The ceremony was over.

The rank of Commodore is the highest honor any steamship line of the American Merchant Marine can offer its licensed personnel. Bestowed in the light of service and accomplishment, it comes to Commodore Berndtson at the age of 43. It follows a record with the Matson Navigation Company that extends back two decades.

● General Petroleum Ceremony

Mrs. Tay Garnett, wife of the Hollywood producer-director, who is a sailor in her own right, having sailed the seven seas in the 105-foot yawl Athene, added human interest and glamour to a ceremony which occurred recently at the yards of the Los Angeles Shipbuilding and Drydock Company.

She riveted a golden spike in the keel of the new 8,200 barrel oil barge now under construction for General Petroleum Corporation. The barge will be used in bunkering the ships now calling at this port in ever increasing numbers. Its length is 139 feet, beam 40 feet and depth 14 feet. It will be equipped with six tanks for fuel and diesel oils.

Among those participating in the dedication ceremonies were **A. O. Woll**, manager of General's marine department; **Lloyd Moore**, assistant manager; **Lloyd Bayly**, sales promotion manager for this major oil company; **George Sutherland**, superintendent of the shipyards; and **Fred Maurer**, who will have charge of the operation of this new General Petroleum barge when it goes into service about January 15th.

Mrs. Tay Garnett (center) wife of well-known motion picture producer, uses compressed air hammer to fasten golden rivet into keel of new General Petroleum steel barge, at plant of Los Angeles Shipbuilding & Drydock Co. Enjoying the ceremony, left to right, are: Lloyd Bayly and A. O. Woll, respectively sales promotion manager and marine department manager of General Petroleum, and George Sutherland, superintendent of the shipyards.

● With the M. M. O. C.

The Merchant Marine Officers Club, 23 California Street, San Francisco, report substantial progress, and many new names have been added to the roster during the past few months. The Club quarters are conveniently located, and a cordial welcome is extended to all licensed men and their friends to visit the Club and meet their fellow officers. A social dance is held twice a month, and the popularity of these affairs is attested by the ever-increasing attendance. Many entertainment activities are being planned for the winter months. Information in reference to the Clubs' aims and objects will be gladly furnished to those eligible for membership by writing Wm. Don, Secretary, or, by calling Exbrook 3868.

The life story of Elmer Ambrose Sperry programmed "The Last of the Oldtime Inventors" was the subject on November 3rd of the DuPont Company's interesting and entertaining "Cavalcade of America" broadcasts.

The announcer introduced the program with a fine tribute to Dr. Sperry who marked the end of one era in invention and stood on the threshold of the next:

"In the past quarter-century, the process of invention has changed. The old type of inventor was more or less of a one man organization. If he thought something might work, he tried it, working out his results to the best of his own ability. But with the spread of technical education, these men have almost disappeared. In their place we have research scientists, directing the efforts of trained assistants who have the advantage of technical knowledge all around them. In many laboratories, for instance, hundreds of research chemists are working constantly to improve our way of living. Their aim is expressed in the Du Pont pledge—"Better things for better living—through Chemistry."

Names and News

WILLIAM J. EDWARDS

The death of William J. Edwards, partner in the firm of Norton, Lilly and Co., came as a severe shock to his many friends when he passed away on the 16th of November in San Francisco. He joined the company about twenty-five years ago and rose steadily, about five years later being sent to San Francisco to establish a branch, where he had been in charge ever since. He was made a partner on his twenty-fifth anniversary of service.

CAPT. M. P. SCHERMERHORN

Thomas G. Plant, vice-president and operating manager of American-Hawaiian Steamship Company, has announced the appointment of Captain M. P. Schermerhorn as Atlantic Coast operating manager for the company. Captain Schermerhorn succeeds to the position made vacant by the passing of Captain James Bennett several months ago. He has been in the employ of American-Hawaiian for a great many years, and was ashore for a month or so preceding his appointment.

AMERICAN-HAWAIIAN NAMES OFFICERS.

At the recent meeting of the Board of Directors of the American-Hawaiian Steamship Company in New York, Roger D. Lapham, president since 1925, was named chairman of the board, a newly created post.

Edward P. Farley continues as chairman of the executive committee, with headquarters in New York.

John E. Cushing, long executive vice-president, was named for the presidency left vacant by Lapham. Both will remain in their headquarters at the company's head office in San Francisco. Changes are effective on January 1.

HUGH B. ROBINSON

The American Commissioner-General of the Paris Exposition has appointed Hugh B. Robinson, European district passenger manager of the United States Lines, to represent the United States on the American jury of awards for maritime exhibits at the exposition.

NEW SHIP AGENCY

The International Shipping Company in Seattle has been incorporated at Olympia by D. R. Girdwood, K. W. Gilmore and Warren Brown, Jr., it was recently announced. The company will engage in ship chartering and will conduct an agency for world-wide service, plans including the operation of steamships, motorships, and sailing vessels. Girdwood is president of the Girdwood Shipping Company of Seattle, which will continue independent of the new corporation, and Gilmore is vice-president and secretary of that company.

FRANK B. INGHAM

Retiring from the Panama Pacific liner California when she docked at her New York pier recently, Frank B. Ingham, chief steward, turned over his post to his assistant, Arthur Connors. Ingham plans to open a restaurant and cocktail bar of his own in Burlingame, in which city he has lived for many years.

He had spent almost ten years on the California, joining her when she was still in the yards of the Newport News Shipbuilding Company in order to supervise the delivery of dining room and kitchen equipment. At that time he held the rank of second steward, but was promoted chief steward two years later. He has made 79 of the 81 round voyages of the ship since that time.

Xzit increases efficiency of applying soot remover product.

THE XZI-LATOR

The Xzit Pacific Company is offering a new electric applicator for Xzit Fire Scale and Soot Remover that promises to greatly simplify and increase the efficiency of applications of that well-known aid to steam generating economy. This device, as shown in the illustration herewith, consists of an electrical motor driven blower and a diffusion nozzle which enables the operator to apply Xzit in such a manner as to cause immediate vaporization and insure maximum results in the shortest possible time.

With this device the operator simply plugs in his cord at the most convenient electric outlet and he is ready for operations. No air or steam connections are necessary, no starting of compressors. Practical operating engineers will recognize this device as a time saving and efficient aid in the problem of keeping the fire side surfaces of steam generators free of soot and scale.

GILBERT MACQUERON

Succeeding Cornelius Winkler, head of the Transpacific Transportation Company, Gilbert Macqueron, general representative on the Pacific Coast for the French Line, has been elected president of the Pacific Foreign Trade Steamship Association.

FORMER SAN FRANCISCAN RECEIVES HONORS

Ellery W. Stone, who is in charge of the radio telephone and radio telegraph operations of the International Telephone and Telegraph Corporation and its subsidiaries, has been elected a Vice President of All America Cables, Inc. and will be in active charge of the radio activities of that company throughout its System, as well as of the radio communication activities of the other I. T. & T. subsidiaries. All America Cables during the last seven years has constantly expanded its radio operations by establishing stations in Central and South America.

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The most potent bulwark ever raised against scale and corrosion in the battle for efficient and economical marine boiler operation—

The HALL MARK signals victory for shipowners thus protected!

Today 224 vessels have eliminated mechanical boiler cleaning expense because their owners realize the value of the HALL SYSTEM OF BOILER WATER CONDITIONING.

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YOU NEED A STRONG GLASS IN SEAS LIKE THIS

WHEN a gale is tearing their tops off and they pound . . . pound . . . pound, it gives you a feeling of greater security to know that your portlights, windscreens and deckhouse windows are glazed with Herculite Tempered Plate Glass. This glass is four times as strong and flexible as normal plate glass of equal thickness. Yet its transparency and good looks are exactly the same. Herculite is available through any of our numerous branches, or the branches of W. P. Fuller Co. on the West Coast. Write Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., for complete information.

expansion and contraction of piping, reduce the number of joints in a pipe system, and avoid obstructions such as columns, foundations, other pipe lines, and so on. In this connection it may be added that in some industries a great amount of study and ingenuity is involved in merely laying out and fabricating pipe bends to clear a host of intricate units essential to plant operation and so situated that they cannot be relocated. This is especially apt to be the case with old plants where one addition after another has been made, with corresponding possibility of interference with any new installations that have to be added under future developments.

Pipe bends have become so common a feature with modern installations that the above company has standardized a large number of shapes most commonly required and adequate in variety to cover about every conceivable purpose. These standard shapes incorporate certain dimensional factors which are indicated on catalog charts by symbols and which are filled in by customers to suit requirements. Thus the man ordering a pipe bend by wire can give the number of the desired bend and actual figures for each of the symbolized dimensions. So a half dozen words cover the entire order with no chance of error in executing the job.

The views in the heading of this article show in Figs. 1 and 2 a large amount of pipe, valve and fitting work handled in the San Francisco branch. These are two views of the Union Oil Company's dewaxing plant at Oleum, California. Other illustrations of typical shop jobs are shown in Figs. 3, 4, and 5. The first of these illustrates a truck and trailer load of 20,000 lbs. of fabricated pipe and fittings for delivery to Fibreboard Products, Inc., Stockton. The entire sales force of the Crane San Francisco organization is seen standing in front of the loaded equipment.

The shop pictures in Figs. 4 and 5 show a considerable portion of the Fibreboard firm's pipe and apparatus in progress of construction or ready for shipment. Both of these views in-

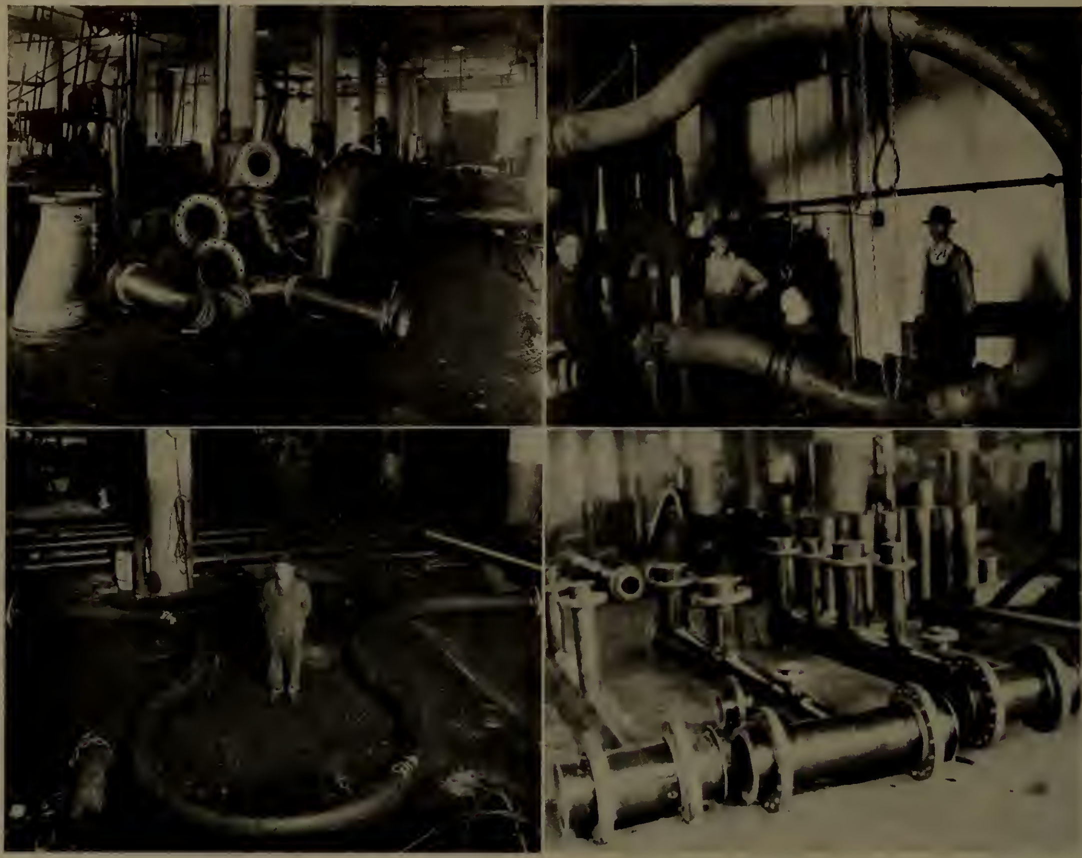

Fig. 5, upper left: Another interior view, showing fabricated pipe and fittings of various sizes and types. Fig. 6, lower left: Large pipe bend lying on big floor plate in shop. Fig. 7, upper right: Operation of Cranelap machine. Fig. 8, lower right: Typical pipe sections with Cranelap joints.

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clude 10 inch, 12 inch, 16 inch, 18 inch, and 20 inch National seamless pipe and Crane fittings fabricated for the boiler room of the above plant at Stockton.

This is an interesting example of the class of work regularly produced at these pipe shops. The bending of such work, particularly in the larger sizes, is an undertaking requiring suitable equipment and careful handling. The pipe length must be cut carefully to requirements, and allowance for bending included. Bends must be so made as to conform to desired dimensions, and this means that offsets and other details must be provided for in such manner that they will bring all flanged pipe ends to practically an exact normal position relative to adjacent pipe sections. Otherwise there will be difficulty in aligning mating sections and securing satisfactory joint surfaces. Whether flanges are threaded and screwed on pipe ends or formed integrally thereon they have to be normal to the axial line of the adjacent pipe, and this involves rather more than ordinary degree of care in bending and measuring the job on the floor plate. Radii of bends, amount of offsets, length of straight sections or tangents, must all be watched and brought to specified dimensions.

Adjoining sections are actually coupled up in the shop and combination tests made on the floor plate to determine that all units will assemble in the field exactly as required. This test is in addition to the physical tests of joint strength and tightness of welds, etc., which are made hydrostatically.

It will be obvious that the larger the pipe the more difficulty is to be expected in producing bends exactly to drawing. This is naturally a fact with all operations on work as the diameters increase to abnormal dimensions. For example, in threading alone, for work up to 18 inches the pipe threading machine is of sufficient capacity, but for larger pipe sizes the lathe is resorted to with single point tools for cutting the thread. The same situation applies to the cutting off of pipe and bell-mouthing or chamfering.

But in any case the shop is well able to handle any size of pipe work wanted and to manipulate the job with entire assurance of accuracy based upon an unusual amount of experience in dealing with problems of this character. Consider for a moment the class of bend exhibited in Figs. 6 and 7. The floor plate in Fig. 6 is 25 by 30 feet in size, and provided at four inch intervals with cored holes by which are located bending jigs and devices which are set rigidly at any necessary point for correct location of the bend in the pipe. Two sheave rolls for guiding hauling lines are seen at opposite corners of the plate. The plate is built up of sections cast five feet square and laid in concrete with the casting face level across the entire structure.

The actual bending process is carried out — with the pipe properly heated at the right point—by means of two overhead hoists operated pneumatically from the floor and each adapted by wire cable leading to the work to pull the pipe around the forms and so form the desired radius and length of arc.

This U bend is a common type for expansion purposes and is used extensively in different sizes of pipe for steam, water, chemical and other lines.

Many assemblies of pipe bends include manifold forms in which bending, welding and flanging may be necessary in the execution of the job. Compound bends are frequently stipulated for purposes of clearance or for unusual connecting lines of piping. In all such instances, as already suggested, it is all-important that the flange faces be brought into square position relative to the main axis of the pipe.

The type of flange for what is known as "Cranelap" joint is produced by a special machine of unique design. A photograph of this machine is shown in Fig. 7 as used in the San Francisco plant. This machine is built for flanging from 1½ to 22 inch pipe. Its purpose is to form (by a rolling process) an integral lap or collar on the end of the pipe, this collar to have a flat, true outer face to enable the loose flange to match a corresponding surface on the mating pipe flange.

In operation, the heated end of the pipe to be "lapped" is slipped into the machine seen at the left and an air controlled ram then descends to clamp the work fast in position. The loose flange is, of course, already slipped onto the pipe before the process of forming the collar is started. Upon starting of the machine spindle an eccentrically-mounted cone shaped former head revolves in contact with the hot open end of the pipe, and being forced by power against that end it causes the pipe end to be swaged or rolled back into a bell-mouthed condition, under much the same action as is applied in the common tube belling operation. Then a flat faced roller carried on a spindle at right angles to the axis of the main spindle of the machine is forced against the expanding hot face of the work and rolls it perfectly flat and into a true disk form of definite diameter and thickness of flange.

A number of short lengths of pipe "Cranelapped" in the above process are shown in the photograph Fig. 8. Note here the clean-rolled or swaged laps on the pipe ends with the uniformly shaped and strong fillets at the base to receive the pull of the pipe flanges when these are bolted up together face to face.

It will be understood that in this Cranelapping process the work is backed up with a stop in definite position, which holds the piece securely against end motion while the rollers are at work on the heated pipe end. This prevents slippage of the work backward and enables definite thickness of lap to be produced under minimum effort in the operation.

Although the common screwed flange joint is used extensively the Cranelap joint is of great importance, especially with the larger sizes of pipe. Here, with the swiveling flange slipped over the pipe (before forming up the pipe end), the installation can be made in any position with the assurance that the flanges can be brought together into proper alignment of bolt holes with no difficulty, while with the screwed flange it is frequently necessary to lower one section of the pipe or the other in order that readjustment of flanges may be attended to. The heavy uniform fillet at the base of the Cranelap joint adds strength to the pipe system instead of weakening it. Moreover, this joint is made with perfectly square corner inside the pipe so that the connection between

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Problems Answered by Chief

(Continued from Page 29)

is in feet then the pitch will be in feet. If diameter is in inches, then pitch will be in inches.

If the reader will reproduce Fig. 1 on a larger sheet of paper and cut out the triangle, then roll it into a cylinder so that the points marked A come together, he can readily visualize the application of the above reasoning. It must be realized that the blade shown in the figure is a cross section at the point of measurement. Thus if the pitch remains a constant value for all points, then as the diameter increases and we measure out closer to the tip the ratio $\frac{PP}{PC}$ must become smaller and the angle B must become larger. This explains the twist in the blade from hub to tip.

QUESTION

What is the slip of the propeller?

ANSWER

There are two slips referred to by designers, the real slip and the apparent slip.

In general, slip is the loss in distance covered or the difference between the pitch and the actual distance moved through the water by the ship. This distance divided by the pitch gives the slip ratio and multiplied by 100 gives the slip in per cent.

If we call distance moved by the ship in 1 revolution, D, and pitch P, then slip is $\frac{P-D}{P} \times 100$ in per cent.

On account of the fact that the bulk of the underwater part of the ship gives rise to a wake or movement of water following the ship somewhat, we have what designers call a wake gain. The propeller does not advance through water as fast as the bow of the ship does. The slip of the propeller in this following wake is called real slip.

The slip calculated from the above formula when D is distance the ship advances through still water is called the apparent slip. This is the practical slip used by marine engineers and is the slip referred to hereafter.

QUESTION

What is the relationship between slip, pitch, revolutions per minute and speed in knots?

ANSWER

This is expressed by the formula

$$K = \frac{P\ (100\text{-}S)}{100} \times \frac{R \times 60}{6080},$$

where K is speed in knots of the ship, P is pitch of propeller in feet, S is slip of propeller in per cent, R is revolutions per minute.

This is regularly used by both the engineer and deck officers in calculating the movement through the water. It is rather a difficult formula to calculate frequently, and to aid those who are interested a chart is printed herewith so arranged that these values may be read off quickly.

The slip will change with many factors, such as condition of the ship's bottom, the weather and other factors. However, if it is calculated occasionally it may be used regularly for speed calculations.

Instructions for Using the Chart

Knowing all the factors but one, the unknown can be read off.

Suppose we want to know the speed in knots. Lay a straight edge or rule on the chart to join the points representing the pitch and the slip. Place a pin in the chart at the point where the straight line crosses the line y-y. Then move the rule to draw a line from the pin to the correct point on the revolutions line. Read the knots off from the speed line.

Two lines are shown on the chart as an example to represent a pitch of 16 feet and slip of 5 per cent. Then at 70 revolutions we find a speed of 10.6 knots.

In like manner the slip can be calculated by locating the pin on the line y-y from the known speed and revolutions. Then draw a line from the pitch to the pin, extend it on to read slip on the slip line.

Additional copies of this chart will be furnished on request to "The Chief," care of Pacific Marine Review, 500 Sansome Street, San Francisco, California.

Our next article will discuss propeller characteristics as related to the engines.

Crane Pipe Bends

(Continued from Page 58)

pipe sections is flush and uninterrupted. This is an aid, naturally, to the free flow of liquids, and also adds materially to the thickness of section at the fillet base and correspondingly to the strength at that point. The lap is full thickness. Besides the joint with both laps the same diameter it can be made up into male and female joints, with female in either the flange or the lap, or with annular tongue and groove around the joint faces. It should be noted that all these joints have sufficient thickness of laps to allow these facings to be machined without reducing the thickness of the lap at any point to less than that of the wall of the pipe.

These laps are all machined on the front, back and edge (outside diameter). The lap is machined at the back to provide a face which is parallel to the front or contact face. The face and radius of the flange is also carefully finished to match the corresponding face and radius of the lap on the pipe.

The bolt holes in the flanges are also spot faced to provide a uniform bearing surface for the nuts of the bolts or studs.

The Cranelap flanges are all of forged steel, unbreakable and of high strength.

Air and Erosion Eliminator

The Condenser Service and Engineering Company, heat exchange engineers, of Hoboken, New Jersey, have had long and successful experience in servicing marine condensers. Very early in this experience they were impressed with the fact that the outstanding troubles in condenser service fell naturally into three classes:

1. Tube deterioration.
2. Tube packing difficulties.
3. Lack of special tools, resulting in poor and inefficient repairs.

By developing special tools and a trained personnel they soon disposed of No. 2 and No. 3, so that their work resulted in tight condensers that continued tight through long service.

The tube deterioration, however, proved a real problem, and it was only after long study and much practical experiment that the engineers of Condenser Service and Engineering Company found a satisfactory solution.

Deterioration of condenser tubing is usually a very complex effect, due to a number of factors whose operation is modified by variations in a number of conditions. Among the factors operating are:

Electrolysis, resulting in dezincification of tubes;

Erosion by entrained air in circulating water;

Corrosion due to oxygen released from entrained air;

Corrosion due to foreiegn chemicals in circulating water.

Experimental condensers were fitted up with various means of drawing off entrained air before it could reach the tube ends. Enormous quantities of air were drawn off but the condenser tube deterioration continued. The next step was to install plates of an electrically negative material supported on a stud in the inlet water box. This apparently gave considerable protection.

From these experiments the Air and Erosion Eliminator was developed.

The means for drawing off air was perfected and plate screens of the electrically negative material were installed in the inlet water box in front of the condenser tube sheet. The holes in this screen are small and the screen is 1½ times the area of the tube ends.

With these screens fitted, with air pipes lead to the circulating water discharge pipe, and with a half venturi nozzle in the division plate to facilitate air discharge, experience has demonstrated that electrolytic and air erosion actions are practically stopped.

First American steamship line to become interested in these experiments was the Isthmian Steamship Company. This firm had a condenser on one of their ships fitted with an Air and Erosion Eliminator, and glass inspection windows, interior illumination, and valves in the air lines, so that the action of the air could be controlled and observed. After a round trip with this condenser, during which test engineers observed the working of the condenser under various conditions, the firm decided to go ahead and equip the condensers of their fleet with these Eliminators.

The first Air and Erosion Eliminator was fitted on the Montgomery City January 19, 1930. This vessel was chosen because her condenser was considered ready for retubing. With the Eliminator in place this condenser ran 5 years and 3 months before retubing. Prior to equipment with these Eliminators the fleet records show an average of seven condensers retubed each year for the fleet of 28 vessels. During the period of seven years from 1930, when the first Eliminator was installed, to 1937, a total of only 3 condensers have been retubed.

Among other remarkable instances of cleaning up condenser tube troubles are the following:

The United States Lines steamship President Roosevelt had a very peculiar condenser condition; retubing of that vessel happened in periods as short as eight months, never longer than 18 months. This was with Admiralty mixture tubes. The condenser was rebuilt, making it from a two pass into a one pass. They then obtained 28 months' life from a set of tubes. Condenser Service and Engineering Company took the existing tubes out of the condenser in April, 1930, and installed Muntz Metal tubes, which no one would normally install in a seagoing ship. Air and Erosion Eliminators were put in at the same time. The results are that the same tubes remain in the condenser today, and they are having no trouble.

Her sister ship, the President Harding, had the same problem. They had an accident going into Hamburg, and the vessel was laid up for repairs for six weeks there during which time the condensers were retubed, using Yorkshire Aluminum Bronze tubes. At the end of a year the air action began to show on the tubes and an Eliminator was installed, which stopped the action.

The Cities Service Co., 60 Wall Street, New York, had a great deal of condenser trouble in their vessels, the worst one being the Cities Service Fuel. Their tube life on this vessel varied from 18 to 24 months. In 1930 Condenser Service retubed the condenser and installed an Eliminator. The same tubes today remain in the condenser.

The Bethlehem Steel Co., on their ships, had a very unusual and active action which destroyed their tubes in a period of 18 to 20 months An Eliminator was installed in one of their vessels, for a trial, about five years ago. This condenser operated for four years, at which period there was absolutely no action of any kind or description on the tubes, and the tubes still remain in good condition—this is more than two and a half times the former tube life. The company then ordered five additional Eliminators for other vessels of their fleet.

The Eugene V. Winter Co. is California sales representative.

laid June 27, 1935 and October 10, 1935, respectively; launching dates, March 13, 1937, and May 15, 1937, respectively.

Three destroyers, **DD397 Benham, DD398 Ellet and DD399 Lang**, estimated completion, April, June and August 1938; keels laid DD397, September 1, 1936; DD398, December 3, 1936; DD-399, April 5, 1937.

Three 12,800-ton tankers for the Standard Oil Company of New Jersey; 450' x 66'6" x 34'6"; Isherwood Arcform design of hull form and longitudinal hull framing. Hull 144, keel laid February 8, 1937; launched October 9, 1937; Hull 145, keel laid June 7, 1937. Hull 146, keel laid August 16, 1937.

Two destroyers, DD411 and DD412.

Two 12,900 ton tankers for Pan American Petroleum & Transport Co.

Hulls Nos. 149-150, two 12,900 ton tankers for Pan American Petroleum & Transport Co.; Isherwood Arcform design of hull form and longitudinal hull framing. Estimated completion date October, 1938.

THE INGALLS IRON WORKS COMPANY
Birmingham, Ala.

NEW CONSTRUCTION:

One 35-ton whirler derrick barge for U. S. Engineers Office, Huntington, W. Va.; 110' x 52' x 8'. Launching date September 21; delivery date, approximately November 15, 1937.

One steel vegetable oil barge for New York Tank Barge Co., N. Y.; 650 gross tons; capacity 1250 tons; 195' x 42' x 12'. Estimated launching date November 1, 1937; estimated delivery date December 1, 1937.

JAKOBSON & PETERSON, INC.
Brooklyn, N.Y.

NEW CONSTRUCTION:

One all welded steel diesel bulk oil delivery launch for Socony-Vacuum Oil Co.; 55' x 13' 6" x 7' deep; 60 HP Model 36A Fairbanks-Morse engine, 3:1 reduction gear.

LEVINGSTON SHIPBUILDING CO.
Orange, Texas

NEW CONSTRUCTION:

Two all welded towboats for Pan American Petroleum & Transport Co., Texas City, Texas; 64'11", beam molded 18', depth molded 7'6"; equipped with 380 H.P. Atlas Imperial diesel engine. Delivery dates December 1, 1937, and January 1, 1938.

Six all welded oil barges; 173' x 39' x8'6"; for Pan American Petroleum & Transport Co., Texas City, Texas. Delivery dates October, 1937, to January 1, 1938.

One all welded barge 100' x 36' x 8', for Standard Oil Co. of Texas, Houston, Texas. Delivery date December 1, 1937.

One all welded barge 90' x 36' x 8', for Standard Oil Company of Texas, Houston, Texas. Delivery date December 1, 1937.

One all welded boiler barge 80' x 25' x 6', for Shell Petroleum Corp. Delivery date December, 1937.

MARYLAND DRYDOCK CO.
Baltimore, Maryland

NEW CONSTRUCTION: **One double ended steel diesel ferry boat**, 208' x 62' x 9', for the Claiborne-Annapolis Ferry Company; keel laid September 15, 1937; estimated launching date December 15, 1937; delivery date May, 1938.

THE NEW YORK SHIPBUILDING CORPORATION
Camden, N. J.

NEW CONSTRUCTION:

Three light cruisers; Hull No. 412, Savannah (CL42), Hull No. 413, Nashville (CL43), and Hull No. 416 Phoenix (CL46) of 10,000 tons each for the U.S. Navy Department; keels laid, 1935. No. 412, launched May 8, 1937; No. 413 launched October 2, 1937.

NEWPORT NEWS SHIPBUILDING & DRYDOCK CO.
90 Broad Street, New York

NEW CONSTRUCTION: **H 359 aircraft carrier CV5, Yorktown**, for U. S. Navy; keel laid May 21, 1934; launched April 4, 1936; delivered September 30, 1937.

H360 aircraft carrier, CV6, Enterprise, for U.S. Navy.; keel laid July 16, 1934; launched October 3, 1936.

H361, light cruiser, CL47, Boise, keel laid April 1, 1935; launched, December 3, 1936.

H362, light cruiser CL49, St. Louis; keel laid December 10, 1936.

Hulls Nos. 363-364, two destroyers, Nos. 413, Mustin, and 414 Russell; estimated keel laying date December, 1937.

Hull No. 367, diesel electric tank vessel for Standard Oil Co. of New Jersey; length 260'6"; beam 43'6"; depth 18'3". Keel laid September, 1937.

Hull No. 369, twin screw mail, passenger and cargo liner for United States Lines Co.

PHILADELPHIA NAVY YARD
Philadelphia, Pa.

NEW CONSTRUCTION:

CA45 Wichita, L.B.P. 600', beam 61' 9¾", depth molded at side to main deck amidships 42'0⅜", draft corresponding to normal displacement 21' 10"; standard displacement 10,000; estimated completion January 1, 1938.

Order placed for **DD404**, 1500 ton destroyer; no dates set.

PORTSMOUTH N. H., NAVY YARD
Portsmouth, N. H.

NEW CONSTRUCTION:

SS185 Snapper, submarine; keel laid July 23, 1936; L.B.P. 300', beam 26', loaded draft 15' 7"; launched August 24, 1937; date of completion March 1, 1938.

SS186 Stingray, submarine; keel laid October 1, 1936; L.B.P. 300', beam 26', loaded draft 15'7"; launched October 6, 1937; date of completion June 1, 1938.

SS191, Sculpin, submarine; contract period started December 1, 1936; L.B. P. 302'6", beam 26'10", loaded draft 16'8"; keel laid September 17, 1937; completion date June 1, 1939.

THE PUSEY & JONES CORP.
Wilmington, Del.

NEW CONSTRUCTION:

Lt. Colonel Ellery W. Niles, twin screw diesel electric drive mine planter for submarine and cable service; L. O. A. 184', L.B.P. 163', beam molded 35', depth molded amidships at sides 17'3", draft load 10'6", speed per hour 13 statute miles. Keel laying date, December 15, 1936; launched June 22, 1937; delivery date November or December, 1937.

Two single screw, steel freight steamers for the Philadelphia and Norfolk Steamship Co., Philadelphia, Pa. L. O. A. 292', L.B.P. 280', beam 48'6", depth 32' 3", draft 18'; geared turbine drive 4000 S. H. P.; 2 water tube boilers. Delivery dates 12½ and 13½ months, respectively. Keel laid for first ship May 20, 1937.

SUN SHIPBUILDING AND DRY DOCK COMPANY
Chester, Pa.

NEW CONSTRUCTION:

Hull No. 160, one oil tanker (steam) 520'x70'x40' for Atlantic Refining Co.; 18,500 tons; keel laid March 22, 1937; launched November 20, 1937; delivery date, December 20, 1937.

Hulls No. 161 and 162, two steam tankers for Standard Oil Co. of New Jersey; 422' x 65' x 35'; 12,900 dwt. No. 161, launched October 2, 1937; delivered November 5, 1937. No. 162, launched October 30, 1937; delivered November 30, 1937.

Hull No. 165, diesel tanker for the Texas Company; 465' x 65' x 34' 6"; 12,000 dwt. Launched October 19, 1937; delivered November 30, 1937.

Hulls Nos. 166 and 167, two steam tankers for Standard Oil Co. of California; 462'4" x 65' x 35'; 12,800 tons deadweight. No. 166, launching date December 4, 1937; delivery date December 26, 1937. No. 167, launching date January 15, 1938; delivery date February 20, 1938.

Hull No. 168, One diesel tanker for Sun Oil Company, equipped with Sun-Doxford engine; 542'5" x 70' x 40'; 18,360 D.W.T. Keel laid September 1, 1937; delivery date June 1, 1938.

Hull No. 169, one oil tanker (steam), 520' x 70' x 40'; for Atlantic Refining Co.; 18,500 tons; keel laying date October 11, 1937; delivery date, September, 1938.

Hull No. 170, one single screw steam tanker for Bernuth, Lembcke Co., Inc., New York; length 462'4"; beam molded 65' 0"; depth molded 35' 0", DWT approximately 12,900 tons. Keel laid September 20, 1937; delivery date June, 1938.

Hull No. 171, one single screw steam tanker for Tide Water Associated Oil Co.; 462' 4" x 65' x 35'; 12,900 dwt.; delivery date July 6, 1938.